REPORT OF AIR POLLUTION SOURCE TESTING OF AN ETHYLENE OXIDE EMISSION-CONTROL SYSTEM OPERATED BY STERIGENICS, US, LLC. IN ONTARIO, CALIFORNIA ON NOVEMBER 17, 2017

Submitted to:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT 21865 East Copley Drive Diamond Bar, California 91765-4182

Submitted by:

STERIGENICS US, LLC. 687 South Wanamaker Avenue Ontario, California 91761

SCAQMD Facility ID 126060

Prepared by:

ECSI, INC. PO Box 1498 San Clemente, California 92674

December 28, 2017

ECSi

CONTACT SUMMARY

CLIENT FACILITY

Ms. Laura Hartman

EHS Manager

STERIGENICS US. LLC.

2015 Spring Road, Suite 650

Oak Brook, Illinois 60523

Mr. Michael Kolesar

General Manager

STERIGENICS US, LLC.

687 South Wanamaker Avenue
Ontario, California 91761

Phone: (630)928-1724 Phone: (909)390-2113 FAX: (630)928-1701 FAX: (909)390-2124

email: LHartman@sterigenics.com email: MKolesar@sterigenics.com

SCAQMD Permit Numbers G47352 (Donaldson Abator) and A/N 580002 (PCS Oxidizer)

TEST DATE

November 17, 2017

REGULATORY AGENCY

Mr. David Liu Air Quality Engineer SCAQMD 21865 East Copley Drive Diamond Bar, California 91765-4182

Phone: (909)396-2438 FAX: (909)396-3341 email: DLiu@agmd.gov

TESTING CONTRACTOR

Daniel P. Kremer President ECSi, Inc. PO Box 1498 San Clemente, California 92674-1498

Phone: (949)400-9145 FAX: (949)281-2169

email: <u>dankremer@ecsi1.com</u>



TABLE OF CONTENTS

			PAGE NO		
CON	TACT SUMM	ARY	i		
TABI	E OF CONTE	ENTS	ii		
LIST	OF TABLES		iii		
LIST	OF APPEND	CES	iv		
1.0	INTRODUC	TION	1		
2.0	EQUIPMEN	ІТ	2		
3.0	TESTING		3		
4.0	0 RULE/COMPLIANCE REQUIREMENTS				
5.0	TEST MET	HOD REFERENCE	5		
	 5.2 Volu 5.3 EtO 5.4 Sam 5.5 GC 5.6 GC 5.7 Calil 5.8 Sam 5.9 Con 	amary/Introduction Imetric Flow Measurement Mass-Emissions Measurement Inple Transport Injection Conditions Conditions Coration Standards Inpling Duration Itrol Efficiency/Mass-Emissions Calculations It Testing	5 5 6 6 7 7 8 8 8		
6.0	TEST SCE	NARIO	10		
7.0	QA/QC		11		
		d Testing Quality Assurance pration Procedures	11 11		
8.0	TEST RESI	JLTS	12		
TABI	ES.		13		
APPI	ENDICES		17		



LIST OF TABLES

<u>TABLE</u>	DESCRIPTION	PAGE NO.
1	Ethylene Oxide Control Efficiency – Backvent (Oxidizer #1)	14
2	Ethylene Oxide Control Efficiency – Backvent (Oxidizer #2)	15
3	Ethylene Oxide Control Efficiency – Aeration (Oxidizer #1)	16
4	Ethylene Oxide Control Efficiency – Aeration (Oxidizer #2)	17
3	Ethylene Oxide Leak Testing	18



LIST OF APPENDICES

<u>APPENDIX</u>	<u>DESCRIPTION</u>	PAGE NO.
Α	Calibration Data	A-1
В	Backvent Chromatograms	B-1
С	Aeration Chromatograms	C-1
D	Field Data and Calculation Worksheets	D-1
F	Gas Certifications	F-1



1.0 INTRODUCTION

On Friday, November 17, 2017, ECSi, Inc. performed annual air pollution source testing and semi-annual leak testing of an ethylene oxide (EtO) sterilization and emission-control system operated by Sterigenics US, LLC. in Ontario, California. The control devices tested included one Donaldson Abator catalytic oxidizer (G47352), and one Pollution Systems recuperative catalytic oxidizer (A/N 580002), which are currently used to control emissions from eight commercial ethylene oxide sterilizer backvents, and two aeration rooms. The purpose of the testing program was to evaluate initial and continued compliance with South Coast Air Quality Management District (SCAQMD) Rule 1405, the conditions established in the permits granted to Sterigenics by the SCAQMD, and with the provisions in 40 CFR, Part 63.363.

2.0 EQUIPMENT

The EtO gas-sterilization system is comprised of eight commercial sterilizers, all discharging through liquidring vacuum pumps to an existing packed-tower acid scrubber emission control device. The sterilization chamber backvents and aeration rooms discharge to a common duct that exhausts to the existing Donaldson EtO Abator catalytic oxidizer and the new Pollution Systems recuperative catalytic oxidizer. These oxidizers maintain a constant flow and a minimum operating temperature in order to preserve destruction efficiency in either simultaneous and parallel operation or independent operation. The gas-sterilization and emissioncontrol equipment consists of the following:

- Six identical Trumbo/Xytel Gas Sterilizers, each comprised of a heated 2460 cubic foot interior volume sterilization chamber, a recirculating vacuum pump chamber evacuation system, a backdraft valve.
- Two identical Trumbo/Xytel Gas Sterilizers, each comprised of a heated 5900 cubic foot interior volume sterilization chamber, a recirculating vacuum pump chamber evacuation system, a backdraft valve, and a fugitive emissions exhaust hood.
- Two heated aeration rooms.

Sterilizer vacuum pump emissions are controlled by:

• One Ceilcote packed tower chemical scrubber, Model SPT-48-168, 4'-0" diameter and 23'-4" high, equipped with a 14' deep bed of No. 1 Tellerette packing, a 5000 gallon reaction tank with two 10 hp/ 151 gpm recirculating pumps (one standby), and a 3 hp/2000 cfm exhaust fan.

Sterilizer backvent and aeration emissions are controlled by:

- One Donaldson EtO Abator System, 25,000 SCFM, equipped with a prefilter, a natural gas fired heater, an exhaust gas heat exchanger, a reactive catalyst bed, and an exhaust blower.
- One Pollution Systems recuperative catalytic oxidizer, Model RCO22, 20,000 SCFM, equipped with a
 prefilter, a natural gas fired heater, an exhaust gas heat exchanger, a reactive catalyst bed, and an
 exhaust blower.



3.0 TESTING

EtO source testing was conducted in accordance with the procedures outlined in CARB Method 431 and USEPA CFR40, Part 63.365. EtO emissions monitoring was conducted simultaneously at the inlet and outlet of the Abator during the entire backvent duration of one of the eight sterilizers, and during three one-hour time intervals of the aeration process.

During backvent/aeration testing, EtO emissions at the inlet and the outlet of each catalytic oxidizer were determined using direct source sample injection into the gas chromatograph (GC). All backvent and aeration testing was performed using freshly sterilized product, under normal operating conditions. The catalytic oxidizers were tested during simultaneous and parallel operation.



4.0 RULE/COMPLIANCE REQUIREMENTS

The EtO gas-sterilization system at Sterigenics US, LLC. was tested to evaluate compliance with the conditions specified in the SCAQMD Permit, and with the requirements outlined in SCAQMD Rule 1405. The current testing was performed to demonstrate initial and continued compliance for the Donaldson and Pollution Systems oxidizers with the following requirements:

- The backvent valve discharge stream must be vented to control equipment with an EtO emissionreduction efficiency of at least 99.0% by weight;
- The aeration discharge stream must be vented to control equipment with an EtO emission-reduction efficiency of at least 99.0% by weight;

Testing is required to demonstrate compliance with these requirements. Source testing of each emission-control device is required initially, and is required annually thereafter.

5.0 TEST METHOD REFERENCE

5.1 INTRODUCTION

EtO source testing was conducted in accordance with the procedures outlined in CARB Method 431 and USEPA CFR40, Part 63.365. EtO emissions monitoring was conducted simultaneously at the inlet and outlet of the Abator during the entire backvent duration of one of the eight sterilizers, and during three one-hour time intervals of the aeration process.

During backvent/aeration testing, EtO emissions at the inlet and the outlet of each catalytic oxidizer were determined using direct source sample injection into the gas chromatograph (GC). All backvent and aeration testing was performed using freshly sterilized product, under normal operating conditions. The catalytic oxidizers were tested during simultaneous and parallel operation.

Operation and documentation of process conditions were performed by personnel from Sterigenics, Inc. using existing monitoring instruments installed by the manufacturer of the equipment to be tested. In accordance with SCAQMD requirements, and the procedures established in USEPA CFR40, Part 63, Subpart O, catalyst bed operating temperature was recorded, and is presented in Tables 1, 2, 3 and 4.

5.2 VOLUMETRIC FLOW MEASUREMENT

Exhaust gas flow at the outlet of the Abator was determined by EPA Method 2C using a standard pitot tube and an inclined-oil manometer. Sampling ports were installed in accordance with EPA Method 1, and are located far enough from any flow disturbances to permit accurate flow measurement.

Temperature measurements were obtained from a type K thermocouple and thermometer attached to the sampling probe. Exhaust gas composition was assumed to be air and small amounts of water vapor. Water vapor was negligible, at about 3 percent.



5.3 CONTROL EFFICIENCY AND MASS EMISSIONS MEASUREMENT

During backvent and aeration testing, EtO emissions at the inlet and outlet of each catalytic oxidizer were determined using direct source sample injection into the GC. The mass of EtO emitted to the inlet and from the outlet were determined using the equation shown below in Section 5.9. Mass-mass control-efficiency of EtO during the backvent and aeration phases was calculated by comparing the mass of EtO vented to the system inlet to the mass of EtO vented from the system outlet.

During the backvent and aeration phases, vented gas was analyzed by an SRI, Model 8610, portable gas chromatograph (GC), equipped with the following: dual, heated sample loops and injectors; dual columns; and dual detectors. A flame ionization detector (FID) was used to quantify inlet EtO emissions, and a photoionization detector (PID) was used to quantify low-level EtO emissions at the emission-control device outlet.

5.4 SAMPLE TRANSPORT

Source gas was pumped to the GC at approximately 500-1000 cubic centimeters per minute (cc/min) from the sampling ports through two lengths of Teflon[®] sample line, each with a nominal volume of approximately 75 cubic centimeters (cc) and an outer diameter of 0.25 inch. At the inlet of each catalytic oxidizer, the sampling port was located in the common backvent/aeration discharge duct, upstream of the oxidizer. At the outlet of each catalytic oxidizer, sampling ports were located in the exhaust stack downstream of the catalyst bed.

5.5 GC INJECTION

Source-gas samples were injected into the GC which was equipped with two heated sampling loops, each containing a volume of approximately 2cc and maintained at 100 degrees Celsius (C). Injections occurred at approximately one-minute intervals during backvent testing, and at approximately five-minute intervals during aeration testing. Helium was the carrier gas for both the FID and PID.



5.6 GC CONDITIONS

The packed columns for the GC were operated at 90 degrees C. The columns were stainless steel, 6 feet long, 0.125 inch outer diameter, packed with 1 percent SP-1000 on 60/80 mesh Carbopack B.

During the analysis, the FID was operated at 250 degrees C. The support gases for the FID were hydrogen (99.995% pure) and air (99.9999% pure). Any unused sample gas was vented from the GC system back to the inlet of the control device being tested.

5.7 CALIBRATION STANDARDS

The FID was calibrated for mid-range part-per-million-by-volume (ppmv) level analysis using gas proportions similar to the following:

- 1) 100 ppmv EtO, balance nitrogen
- 2) 50 ppmv EtO, balance nitrogen (audit gas)
- 3) 10 ppmv EtO, balance nitrogen
- 4) 1 ppmv EtO, balance nitrogen

The PID was calibrated for low-range ppmv level analysis using gas proportions similar to the following:

- 1) 100 ppmv EtO, balance nitrogen
- 2) 50 ppmv EtO, balance nitrogen (audit gas)
- 3) 10 ppmv EtO, balance nitrogen
- 4) 1 ppmv EtO, balance nitrogen

Each of these calibration standards was in a separate, certified manufacturer's cylinder. Copies of the calibration gas laboratory certificates are attached as Appendix E.

5.8 SAMPLING DURATION

Sampling was performed during the entire backvent duration of one of the eight sterilizers, and during three one hour time intervals of the aeration process. The catalytic oxidizers were tested during simultaneous and parallel operation.

Backvent testing was performed with freshly sterilized product in the sterilization chamber, upon initial opening of the backvent valve at the conclusion of the sterilizer vacuum vent phase. All aeration testing was performed with freshly sterilized product in the aeration rooms.

5.9 CONTROL-EFFICIENCY/MASS-EMISSIONS CALCULATIONS

Mass emissions of EtO during the backvent and aeration phases were calculated using the following equation:

MassRate = (VolFlow)(MolWt)(ppmv EtO/10⁶)/(MolVol)

Where:

MassRate = EtO mass flow rate, pounds per minute

VolFlow = Corrected volumetric flow rate, standard cubic feet per minute at 68 degrees F

MolWt = 44.05 pounds EtO per pound mole

ppmv EtO = EtO concentration, parts per million by volume

10⁶ = Conversion factor, ppmv per "cubic foot per cubic foot"

MolVol = 385.32 cubic feet per pound mole at one atmosphere and 68 degrees F

Mass-mass control efficiency of EtO was calculated for the backvent/aeration. Results of the control-efficiency testing are presented in Section 8.0 and Tables 1 and 2.

5.11 LEAK TESTING

Testing for EtO leaks was conducted by CARB Method 21 in accordance with SCAQMD Rule 1405. Testing was conducted during the exposure and chamber evacuation phases of the sterilization and exhaust cycles of the sterilizer. These conditions represent maximum sterilant gas mass flow through the system.

EtO leak testing was performed using a Bacharach EO Leakator, Part Number 19-7057, Gas Leak Detector, equipped with a metal-oxide semi-conductor sensor, an audible signal, and a visual display. The lower detection limit of the instrument is less than the leak definition specified for EtO in SCAQMD Rule 1405. This leak definition is 10 ppm EtO for sterilant gas composed of 100 percent EtO.



EtO concentration was measured one centimeter from the surface of all accessible components of the sterilizer and emission-control device that are potential sources of EtO leakage. Each component found to be leaking was identified and tagged. The date and the results of the EtO measurement for each leaking component were entered on that component's tag. The leak test data is summarized in Section 8.0 and in Table 3.

6.0 TEST SCENARIO

Each emission-control device was tested under normal operating conditions, with both oxidizers in simultaneous/parallel operation. Each test consisted of one 15-minute backvent phase and three one-hour intervals of the 24-hour/day aeration process, with freshly sterilized product in aeration.



7.0 QA/QC

7.1 FIELD TESTING QUALITY ASSURANCE

At the beginning of the test, the sampling system was leak checked at a vacuum of 15 inches of mercury. The sampling system was considered leak free when the flow indicated by the rotameters fell to zero.

At the beginning of the test, a system blank was analyzed to ensure that the sampling system was free of EtO. Ambient air was introduced at the end of the heated sampling line and drawn through the sampling system line to the GC for analysis. The resulting chromatogram also provided a background level for non-EtO components (i.e. ambient air, carbon dioxide, water vapor) which are present in the source gas stream due to the ambient dilution air which is drawn into the emission-control device, and due to the destruction of EtO by the emission-control device which produces carbon dioxide and water vapor. This chromatogram, designated AMB, is included with the calibration data in Appendix A.

7.2 CALIBRATION PROCEDURES

The GC system was calibrated at the beginning and conclusion of each day's testing. Using the Peaksimple II analytical software, a point-to-point calibration curve was constructed for each detector. A gas cylinder of similar composition as the calibration gases, but certified by a separate supplier, was used to verify calibration gas composition and GC performance.

All calibration gases and support gases used were of the highest purity and quality available. A copy of the laboratory certification for each calibration gas is attached as Appendix E.



8.0 TEST RESULTS

The Donaldson EtO Abator (Oxidizer #1) demonstrated an EtO control efficiency of 99.93 percent for the control of backvent emissions, and 99.94 percent for the control of aeration emissions. The Pollution Systems Oxidizer (Oxidizer #2) demonstrated an EtO control efficiency of 99.94 percent for the control of backvent emissions, and 99.92 percent for the control of aeration emissions. SCAQMD Rule 1405 specifies that EtO emission-control devices, at gas sterilization facilities with EtO usage in the range of Sterigenics US, LLC., must have an EtO control efficiency of 99.0 percent or more during the aeration and backvent phases. Both emission-control devices met this requirement.

The entire gas sterilization and emission control system was also found to be leak free.

The test results are summarized in Table 1, 2, 3, 4 and 5. Chromatograms and chromatographic supporting data are attached as Appendices A through C. Copies of field data and calculation worksheets are attached as Appendix D.

TABLES

TABLE 1 ETHYLENE OXIDE CONTROL EFFICIENCY - BACKVENT OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (OXIDIZER #1) OPERATED BY STERIGENICS, INC. IN ONTARIO, CALIFORNIA ON NOVEMBER 17, 2017

CYCLE PHASE	INJECTION <u>TIME</u>	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
Backvent(3)	940	15.8	0.01	99.9367
Backvent	942	15.9	0.01	99.9371
Backvent	943	14.4	0.01	99.9306
Backvent	944	13.6	0.01	99.9265
Backvent	945	13.7	0.01	99.9270
Backvent	946	15.9	0.01	99.9371
Backvent	948	16.7	0.01	99.9401
Backvent	949	15.4	0.01	99.9351
Backvent	950	15.2	0.01	99.9342
Backvent	951	15.5	0.01	99.9355
Backvent	953	15.6	0.01	99.9359
Backvent	954	<u>14.8</u>	<u>0.01</u>	99.9324
TIME-WEIGI	HTED AVERAGE:	15.21	0.0100	99.9340

SCAQMD REQUIRED CONTROL EFFICIENCY: 99.0

Notes:

- (1) PPM = parts per million by volume
- (2) 0.01 ppm is the quantification limit for the detector used at the outlet.
- (3) The backvent phase test run started at 09:40, ended at 09:55.
- (4) The average catalyst bed temperature recorded during the test run was 293 degrees F.

TABLE 2 ETHYLENE OXIDE CONTROL EFFICIENCY - BACKVENT OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE (OXIDIZER #2) OPERATED BY STERIGENICS, INC. IN ONTARIO, CALIFORNIA ON NOVEMBER 17, 2017

CYCLE PHASE	INJECTION <u>TIME</u>	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
Backvent(3)	1006	174	0.01	99.9943
Backvent	1007	20.0	0.01	99.9500
Backvent	1008	17.3	0.01	99.9422
Backvent	1009	15.4	0.01	99.9351
Backvent	1010	15.1	0.01	99.9338
Backvent	1012	14.3	0.01	99.9301
Backvent	1013	14.3	0.01	99.9301
Backvent	1014	15.3	0.01	99.9346
Backvent	1015	16.8	0.01	99.9405
Backvent	1016	15.5	0.01	99.9355
Backvent	1018	15.9	0.01	99.9371
Backvent	1019	<u>14.6</u>	<u>0.01</u>	<u>99.9315</u>
TIME-WEIG	HTED AVERAGE:	29.04	0.0100	99.9412

SCAQMD REQUIRED CONTROL EFFICIENCY:

Notes:

- (1) PPM = parts per million by volume
- (2) 0.01 ppm is the quantification limit for the detector used at the outlet.
- (3) The backvent phase test run started at 10:05, ended at 10:20.
- (4) The average catalyst bed temperature recorded during the test run was 302 degrees F.

99.0

TABLE 3 ETHYLENE OXIDE CONTROL EFFICIENCY - AERATION OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE - OXIDIZER #1 OPERATED BY STERIGENICS, INC. IN ONTARIO, CALIFORNIA ON NOVEMBER 17, 2017

RUN <u>NUMBER</u>	INJECTION <u>TIME</u>	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	1030	18.7	0.01	99.9465
1	1035	17.9	0.01	99.9441
1	1040	17.3	0.01	99.9422
1	1045	16.5	0.01	99.9394
1	1050	19.0	0.01	99.9474
1	1055	17.3	0.01	99.9422
1	1100	18.4	0.01	99.9457
1	1105	17.5	0.01	99.9429
1	1110	17.7	0.01	99.9435
1	1115	15.7	0.01	99.9363
1	1120	16.5	0.01	99.9394
1	1125	17.9	0.01	99.9441
2(4)	1130	17.3	0.01	99.9422
2	1135	16.9	0.01	99.9408
2	1140	17.2	0.01	99.9419
	1145	14.8	0.01	99.9324
2 2	1150	16.4	0.01	99.9390
2	1155	15.6	0.01	99.9359
2	1200	15.6	0.01	99.9359
2	1205	16.2	0.01	99.9383
2	1210	15.1	0.01	99.9338
2	1215	14.0	0.01	99.9286
2	1220	13.9	0.01	99.9281
2	1225	15.7	0.01	99.9363
3(5)	1230	14.5	0.01	99.9310
3	1235	14.4	0.01	99.9306
3	1240	14.8	0.01	99.9324
3	1245	15.2	0.01	99.9342
3 3	1250	14.8	0.01	99.9324
3	1255	15.7	0.01	99.9363
3	1300	15.8	0.01	99.9367
3	1305	14.4	0.01	99.9306
3	1310	14.2	0.01	99.9296
3	1315	13.7	0.01	99.9270
3	1320	13.7	0.01	99.9270
3	1325	<u>14.2</u>	<u>0.01</u>	<u>99.9296</u>
TIME-W	EIGHTED AVERAGE:	15.96	0.0100	99.9368

SCAQMD REQUIRED CONTROL EFFICIENCY: 99.0%

Notes:

- (1) PPM = parts per million by volume
- (2) 0.01 ppm is the quantification limit for the detector used at the outlet.
- (3) Aeration Phase Test Run #1 started at 10:28, ended at 11:28.
- (4) Aeration Phase Test Run #2 started at 11:28, ended at 12:28.
- (5) Aeration Phase Test Run #3 started at 12:28, ended at 13:28.
- (4) The average catalyst bed temperature recorded during the test was 293 degrees F.

TABLE 4 ETHYLENE OXIDE CONTROL EFFICIENCY - AERATION OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE - OXIDIZER #2 OPERATED BY STERIGENICS, INC. IN ONTARIO, CALIFORNIA ON NOVEMBER 17, 2017

RUN <u>NUMBER</u>	INJECTION <u>TIME</u>	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	1032	16.4	0.01	99.9390
1	1037	15.2	0.01	99.9342
1	1042	16.3	0.01	99.9387
1	1047	15.7	0.01	99.9363
1	1052	16.6	0.01	99.9398
1	1057	16.9	0.01	99.9408
1	1102	14.2	0.01	99.9296
1	1107	13.7	0.01	99.9270
1	1112	12.8	0.01	99.9219
1	1117	12.8	0.01	99.9219
1	1122	12.7	0.01	99.9213
1	1127	14.2	0.01	99.9296
2(4)	1132	13.7	0.01	99.9270
2	1137	16.8	0.01	99.9405
2	1142	12.9	0.01	99.9225
2 2 2	1147	13.5	0.01	99.9259
2	1152	12.6	0.01	99.9206
2	1157	14.0	0.01	99.9286
2 2	1202	13.8	0.01	99.9275
2	1207	13.3	0.01	99.9248
2 2 2	1212	11.7	0.01	99.9145
2	1217	11.6	0.01	99.9138
	1222	12.3	0.01	99.9187
2	1227	13.5	0.01	99.9259
3(5)	1232	11.2	0.01	99.9107
3	1237	11.7	0.01	99.9145
3 3	1242	11.7	0.01	99.9145
3	1247	12.1	0.01	99.9174
3	1252	13.0	0.01	99.9231
3	1257	13.7	0.01	99.9270
3	1302	12.0	0.01	99.9167
3	1307	11.6	0.01	99.9138
3 3	1312	11.8	0.01	99.9153
3	1317	12.2	0.01	99.9180
3	1322	11.0	0.01	99.9091
3	1327	<u>12.6</u>	<u>0.01</u>	<u>99.9206</u>
TIME-W	EIGHTED AVERAGE:	13.38	0.0100	99.9242

SCAQMD REQUIRED CONTROL EFFICIENCY:

99.0%

Notes:

- (1) PPM = parts per million by volume
- (2) 0.01 ppm is the quantification limit for the detector used at the outlet.
- (3) Aeration Phase Test Run #1 started at 10:30, ended at 11:30.
- (4) Aeration Phase Test Run #2 started at 11:30, ended at 12:30.
- (5) Aeration Phase Test Run #3 started at 12:30, ended at 13:30.
- (4) The average catalyst bed temperature recorded during the test was 302 degrees F.

TABLE 5 ETHYLENE OXIDE LEAK TESTING OF A GAS STERILIZATION SYSTEM (8 STERILIZERS) OPERATED BY STERIGENICS, INC. IN ONTARIO, CALIFORNIA ON NOVEMBER 17, 2017

COMPONENT GROUP TESTED	LEAKING COMPONENTS FOUND	CONCENTRATION
Supply Tanks / Load Stations	None	<1.0 ppm (1)
Sterilizer Inlets / Inbleed Valves	None	<1.0 ppm
Door Seals	None	<1.0 ppm
Sterilizer Outlets / Chamber Drains	None	<1.0 ppm
Vacuum Pumps	None	<1.0 ppm
Emission Control Device Inlet	None	<1.0 ppm

Notes:

(1) - PPM = parts per million by volume

APPENDICES

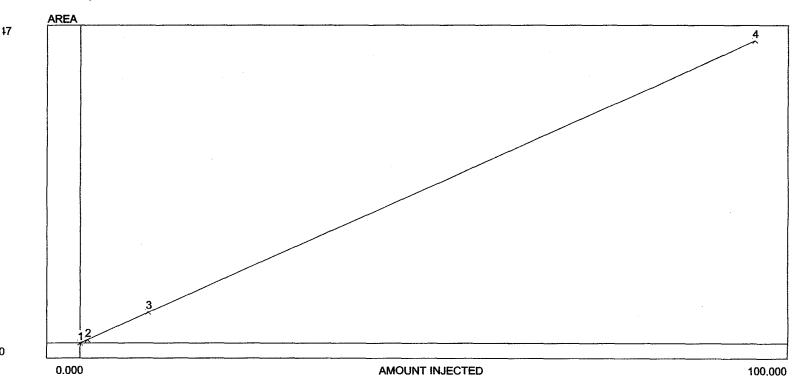
APPENDIX A

Calibration Data



² eak	Name	Start	End	Calibration	Int.Std	Units
1	Dead Vol / Air	0.000	0.300		0.000	
2	Ambient H2O	0.300	0.450		0.000	
3	Ethylene Oxide	0.450	0.550	C:\peak359\1Ster	0.00017	.ppm
ļ.	Acetaldehyde	0.550	0.800		0.000	
5	CO2	0.800	1.000		0.000	

Calibration file: C:\peak359\1SterOnt2017.cal



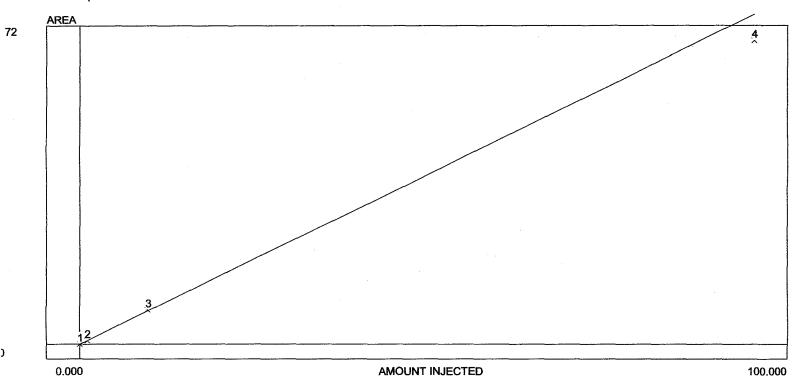
Avg slope of curve: 0.47 Y-axis intercept: 0.00 Linearity: 1.00 Number of levels: 4 SD/rel SD of CF's: 0.2/66.7

Y=0.4669X r2: 1.0000

Last calibrated: Fri Nov 17 09:32:24 2017

Lv	l. Area/ht.	Amount	CF	Current	Previou	s #1Previous	#2
1	0.000	0.000	0.000	0.000	N/A	N/A	
2	0.502	1.100	0.456	0.502	N/A	N/A	
3	4.820	10.100	0.477	4.820	N/A	N/A	
4	46.700	100.000	0.467	46.700	N/A	N/A	

³ eak	Name	Start	End	Calibration	Int.Std	Units
J	Dead Vol / Air	0.000	0.300		0.000	
2	Ambient H2O	0.300	0.470		0.000	
3	Ethylene Oxide	0.470	0.570	C:\peak359\2Ste	er0.00017	7.ppm
ŀ	Acetaldehyde	0.570	0.800	-	0.000	
5	CO2	0.800	1.000		0.000	



Avg slope of curve: 1.87 Y-axis intercept: 0.00 Linearity: 1.00 Number of levels: 4 SD/rel SD of CF's: 0.9/67.1 Y=1.8714X

r2: 0.9999

Last calibrated: Fri Nov 17 09:31:38 2017

L۷	l. Area/ht.	Amount	CF	Current	Previous	s #1Previous #2
1	0.000	0.000	0.000	0.000	N/A	N/A
2	2.160	1.100	1.964	2.160	N/A	N/A
3	19.500	10.100	1.931	19.500	N/A	N/A
4	172.000	100.000	1.720	172.000	N/A	N/A

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-Amb.CHR (c:\peak359) Data file: 2SterOnt2017-Amb.CHR (c:\peak359) Sample: Ambient Background Sample: Ambient Background Operator: D. Kremer Operator: D. Kremer 64.000 External/Units 16.000 -1.600 -6.400 Dead Voi / Air 30.6770/0.083 0.0000/ 3.3110/0.233 Component Retention Area External Units Component Retention Area External Units Dead Vol / Air 0.233 3.3110 0.0000 Dead Vol / Air 0.083 30.6770 0.0000 3.3110 0.0000 30.6770 0.0000

Lab hame. Ecor

Client ID: PreCal

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

Analysis date: 11/17/2017 09:03:34

Method: Direct Injection

Description: CHANNEL 2 - PID

Lab hame. ECSI

Client ID: PreCal

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

Analysis date: 11/17/2017 09:03:34 Method: Direct Injection

Description: CHANNEL 1 - FID

Haine. Loui Client: Sterigenics - Ontario Client ID: PreCal Analysis date: 11/17/2017 09:07:37

Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-C01.CHR (c:\peak359)
Sample: 100 ppm EtO std

47.8280

0.0000

Operator: D. Kremer

Client: Sterigenics - Ontario Client ID: PreCal

Analysis date: 11/17/2017 09:07:37 Method: Direct Injection Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Data file: 2SterOnt2017-C01.CHR (c:\peak359)

0.883

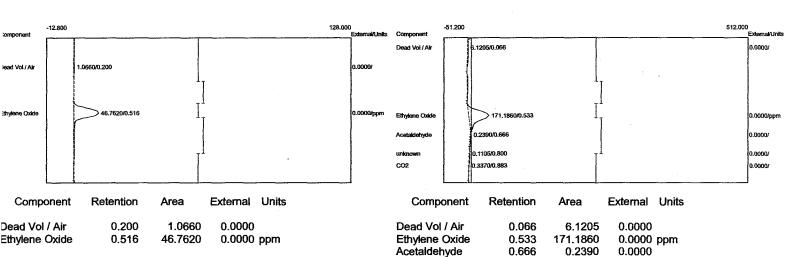
0.3370

177.8825

0.0000

0.0000

Sample: 100 ppm EtO std Operator: D. Kremer



CO₂

Client: Sterigenics - Ontario Client ID: PreCal Analysis date: 11/17/2017 09:09:34 Method: Direct Injection Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B Carrier: HELIUM Temp. prog: eto-100.tem

Components: eto1-100.cpt Data file: 1SterOnt2017-C02.CHR (c:\peak359)
Sample: 100 ppm EtO std

Operator: D. Kremer

Lab Hallie. LUGI

Client: Sterigenics - Ontario Client ID: PreCal

Analysis date: 11/17/2017 09:09:34

Method: Direct Injection Description: CHANNÉL 2 - PID Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

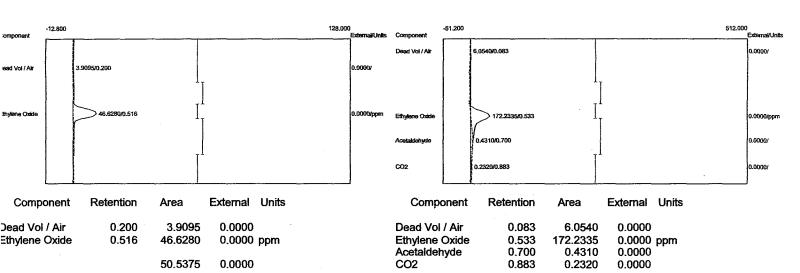
Lad Hairie, Loci

Data file: 2SterOnt2017-C02.CHR (c:\peak359)

178.9505

0.0000

Sample: 100 ppm EtO std Operator: D. Kremer



Lau Haille. LUOI Client: Sterigenics - Ontario Client ID: PreCal

Analysis date: 11/17/2017 09:13:20 Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-C03.CHR (c:\peak359)

Sample: 10.1 ppm EtO std Operator: D. Kremer

Analysis date: 11/17/2017 09:13:20 Method: Direct Injection Description: CHANNÉL 2 - PID

Column: 1% SP-1000, Carbopack B

Client: Sterigenics - Ontario

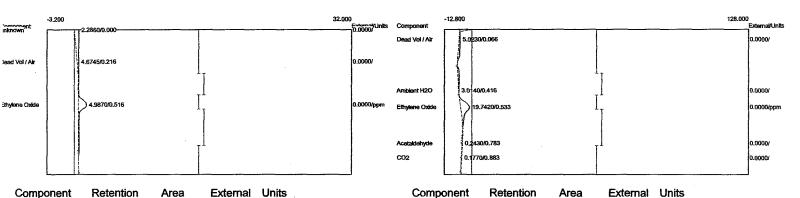
Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Lay Haine. Low

Client ID: PreCal

Data file: 2SterOnt2017-C03.CHR (c:\peak359)

Sample: 10.1 ppm EtO std Operator: D. Kremer



Component	1 (Cloiridon	7400	External Office	Component	recentagn	Alou	External offi	
Dead Vol / Air	0.216	4.6745	0.0000	Dead Vol / Air	0.066	5.0230	0.0000	
Ethylene Oxide	0.516	4.9870	0.0000 ppm	Ambient H2O	0.416	3.0140		
				Ethylene Oxide	0.533	19.7420	0.0000 ppm	n
		9.6615	0.0000	Acetaldehyde	0.783	0.2430	0.0000	
			*	CO2	0.883	0.1770	0.0000	

28.1990 0.0000 Lay Haille. Looi Client: Sterigenics - Ontario Client ID: PreCal

Analysis date: 11/17/2017 09:16:34 Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-C04.CHR (c:\peak359)

Sample: 10.1 ppm EtO std Operator: D. Kremer

Client: Sterigenics - Ontario Client ID: PreCal

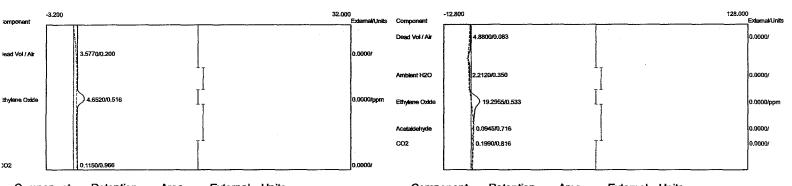
Analysis date: 11/17/2017 09:16:34 Method: Direct Injection Description: CHANNEL 2 - PID

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Data file: 2SterOnt2017-C04.CHR (c:\peak359)

Sample: 10.1 ppm EtO std Operator: D. Kremer



Retention	Area	External Units	Component	Retention	Area	External Units	;
0.200	3.5770	0.0000	Dead Vol / Air	0.083	4.8800	0.0000	
0.516	4.6520	0.0000 ppm	Ambient H2O	0.350	2.2120	0.0000	
0.966	0.1150	0.0000	Ethylene Oxide	0.533	19.2955	0.0000 ppm	
			Acetaldehyde	0.716	0.0945	0.0000	
	8.3440	0.0000	CO2	0.816	0.1990	0.0000	
	0.200 0.516	0.200 3.5770 0.516 4.6520 0.966 0.1150	0.200 3.5770 0.0000 0.516 4.6520 0.0000 ppm 0.966 0.1150 0.0000	0.200 3.5770 0.0000 Dead Vol / Air 0.516 4.6520 0.0000 ppm Ambient H2O 0.966 0.1150 0.0000 Ethylene Oxide Acetaldehyde	0.200 3.5770 0.0000 Dead Vol / Air 0.083 0.516 4.6520 0.0000 ppm Ambient H2O 0.350 0.966 0.1150 0.0000 Ethylene Oxide 0.533 Acetaldehyde 0.716	0.200 3.5770 0.0000 Dead Vol / Air 0.083 4.8800 0.516 4.6520 0.0000 ppm Ambient H2O 0.350 2.2120 0.966 0.1150 0.0000 Ethylene Oxide 0.533 19.2955 Acetaldehyde 0.716 0.0945	0.200 3.5770 0.0000 Dead Vol / Air 0.083 4.8800 0.0000 0.516 4.6520 0.0000 ppm Ambient H2O 0.350 2.2120 0.0000 0.966 0.1150 0.0000 Ethylene Oxide 0.533 19.2955 0.0000 ppm Acetaldehyde 0.716 0.0945 0.0000

26.6810 0.0000 Lab hame. ECSI Client: Sterigenics - Ontario Client ID: PreCal

Analysis date: 11/17/2017 09:20:35 Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-C05.CHR (c:\peak359)

Sample: 1.10 ppm EtO std Operator: D. Kremer

Client ID: PreCal Analysis date: 11/17/2017 09:20:35

Method: Direct Injection Description: CHANNEL 2 - PID

Column: 1% SP-1000, Carbopack B

Client: Sterigenics - Ontario

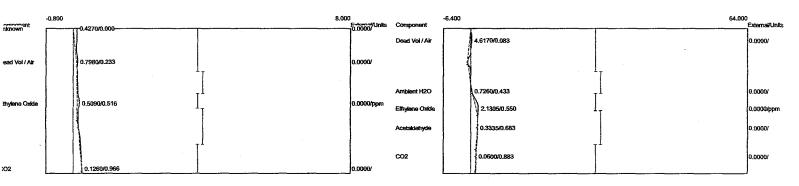
Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Lab hame. Econ

Data file: 2SterOnt2017-C05.CHR (c:\peak359)

Sample: 1.10 ppm EtO std

Operator: D. Kremer



Component	Retention	Area	External Units	Component	Retention	Area	External Units
Dead Vol / Air	0.233	0.7980	0.0000	Dead Vol / Air	0.083	4.6170	0.0000
Ethylene Oxide	0.516	0.5090	0.0000 ppm	Ambient H2O	0.433	0.7260	0.0000
DO2	0.966	0.1260	0.0000	Ethylene Oxide	0.550	2.1305	0.0000 ppm
				Acetaldehyde	0.683	0.3335	0.0000
		1.4330	0.0000	CO2	0.883	0.0600	0.0000

0.0000 7.8670

Lab name: ECOI Client: Sterigenics - Ontario Client ID: PreCal

Analysis date: 11/17/2017 09:25:47 Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-C06.CHR (c:\peak359)

Sample: 1.10 ppm EtO std

Operator: D. Kremer

Column: 1% SP-1000, Carbopack B Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Lab hame. Eco

Client ID: PreCal

Analysis date: 11/17/2017 09:25:47

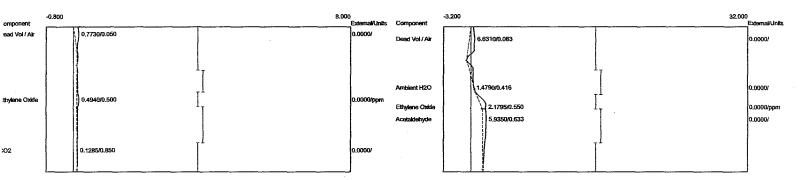
Method: Direct Injection Description: CHANNEL 2 - PID

Data file: 2SterOnt2017-C06.CHR (c:\peak359)

Sample: 1.10 ppm EtO std

Client: Sterigenics - Ontario

Operator: D. Kremer



Component	Retention	Агеа	External Units	Component	Retention	Area	External Units	
Dead Vol / Air	0.050	0.7730	0.0000	Dead Vol / Air	0.083	6.6310	0.0000	
Ethylene Oxide	0.500	0.4940	0.0000 ppm	Ambient H2O	0.416	1.4790	0.0000	
CO2 0.850	0.850	0.1285	0.0000	Ethylene Oxide	0.550	2.1795	0.0000 ppm	
				Acetaldehyde	0.633	5.9350	0.0000	
		1.3955	0.0000	•				
						16.2245	0.0000	

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto2-100.cpt Components: eto1-100.cpt Data file: 2SterOnt2017-C07.CHR (c:\peak359) Sample: 48.8 ppm EtO std Data file: 1SterOnt2017-C07.CHR (c:\peak359) Sample: 48.8 ppm EtO std Operator: D. Kremer Operator: D. Kremer -25,600 256.000 64.000 11.1440/0.083 Dead Vol / Air 2.0900/0.233 0.0000/)ead Vol / Air Ambient H2O 2.1810/0.400 0.0000/ 23.0015/0.500 49.8300/ppm 93,2540/0,516 Ethylene Oxide 0.2015/0.733 0.0000/ CO2 0.1440/0.816 0.0000/ Component Retention Area External Units Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Ethylene Oxide

Acetaldehyde

CO2

/ Hallie.

Client ID: PreCal Analysis date: 11/17/2017 09:30:34

Carrier: HELIUM

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B

0.083

0.400

0.516

0.733

0.816

11.1440

2.1810

0.2015

0.1440

106.9245

93.2540

0.0000

0.0000

0.0000

0.0000

49.8300

49.8300 ppm

Method: Direct Injection

Lau Hairle, LVOI

Client ID: PreCal

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.233

0.500

Dead Vol / Air Ethylene Oxide 2.0900

23.0015

25.0915

0.0000

49.2681

49.2681 ppm

Analysis date: 11/17/2017 09:30:34

Method: Direct Injection

Client: Sterigenics - Ontario Client: Sterigenics - Ontario Client ID: PostCal Client ID: PostCal Analysis date: 11/17/2017 14:41:13 Analysis date: 11/17/2017 14:41:13 Method: Direct Injection Method: Direct Injection Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-C08.CHR (c:\peak359) Data file: 2SterOnt2017-C08.CHR (c:\peak359) Sample: 48.8 ppm EtO std Sample: 48.8 ppm EtO std Operator: D. Kremer Operator: D. Kremer 32.000 -25.600 256.000 lead Vol / Air 0.9680/0.050 0.00001 14.9820/0.083 Dead Vol / Air 0.0000/ 1.7700/0.416 Ambient H2O 0.0000/ 48,2435/ppr 0.1620/0.766 0.1215/0.816 0.0000/ Aceta CO2

Lab Haille. Luci

 Component
 Retention
 Area
 External
 Units

 Dead Vol / Air
 0.050
 0.9680
 0.0000

 Ethylene Oxide
 0.500
 22.6610
 48.5388 ppm

 23.6290
 48.5388

Lab Haille. Looi

Component	Retention	Alea	External	Units
Dead Vol / Air	0.083	14.9820	0.0000	
Ambient H2O	0.416	1.7700	0.0000	
Ethylene Oxide	0.516	90.2850	48.2435	ppm
Acetaldehyde	0.766	0.1620	0.0000	
CO2	0.816	0.1215	0.0000	

107.3205 48.2435

APPENDIX B

Backvent Chromatograms



Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-1B01.CHR (c:\peak359) Data file: 1SterOnt2017-1B01.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 -3.200 32.000 16.4580/0.066 0.0000/ Dead Vol / Air 2.4755/0.216 0.0000/ Ambient H2O 176,9950/0.383 0.0000 15.8258/ppm Retention External Units Component Retention External Units Component Area Area Dead Vol / Air 0.216 2.4755 0.0000 Dead Vol / Air 0.066 16.4580 0.0000 0.0000 Ambient H2O 0.350 0.1280 Ambient H2O 0.383 176.9950 0.0000

15.8258 ppm

15.8258

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

7.3885

9.9920

Client ID: Run#1BV Analysis date: 11/17/2017 09:40:58

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Method: Direct Injection Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

193.4530

0.0000

Client ID: Run#1BV

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:40:58 Method: Direct Injection

Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B02.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-1B02.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64,000 0.0000/Units 2.1820/0.216 0.0000/ Ambient H2O 171.1580/0.383 0.0000/ 15.9168/ррп Component Retention Area External Units Component Retention Area External Units 0.0000 Dead Vol / Air 0.216 2.1820 Ambient H2O 0.383 171.1580 0.0000

HICHITA.

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:42:08 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.0000

171.1580

Hairic. LOOI

Client ID: Run#1BV

Carrier: HELIUM

Ethylene Oxide

Analysis date: 11/17/2017 09:42:08

Method: Direct Injection Description: CHANNÉL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

7.4310

9.6130

15.9168 ppm

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B03.CHR (c:\peak359) Data file: 2SterOnt2017-1B03.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 0.0000/Units 23.1390/0.000 2.2970/0.233 167.7260/0.383 0.0000/ 14.3832/ppm Retention Component Area External Units Retention External Units Component Area 0.0000 Dead Vol / Air 0.233 2.2970 Ambient H2O 0.383 167.7260 0.0000 Ethylene Oxide 0.500 14.3832 ppm 6.7150 167.7260 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Client ID: Run#1BV

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:43:13 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

14.3832

9.0120

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:43:13 Method: Direct Injection

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B04.CHR (c:\peak359) Data file: 2SterOnt2017-1B04.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 External/Units 10.0000/ 23.8510/0.000 2.3000/0.216 lead Vol / Air 0.00007 0.1270/0.350 0.0000/ 70.2680/0.383 0.0000/ 13.5778/ppm Retention External Units Component Area Component Retention External Units Area 0.0000 Dead Vol / Air 0.216 2.3000 Ambient H2O 0.383 170.2680 0.0000 Ambient H2O 0.1270 0.0000 0.350

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

170.2680

0.0000

Client ID: Run#1BV

Carrier: HELIUM

Analysis date: 11/17/2017 09:44:17

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.3390

8.7660

13.5778 ppm

13.5778

Client ID: Run#1BV

Carrier: HELIUM

Ethylene Oxide

Analysis date: 11/17/2017 09:44:17

Method: Direct Injection

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B05.CHR (c:\peak359) Data file: 2SterOnt2017-1B05.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 5.0000/Units 2.3030/0.216 0.0000/ 0.1270/0.350 mbient H2O 0.0000/ Ambient H2O 169.1460/0.383 0.0000/ 6.4090/0.500 13.7278/ppm Component Retention Area External Units Component Retention Area External Units Dead Vol / Air 0.216 2.3030 0.0000 Ambient H2O 0.383 169.1460 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

169.1460

0.0000

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:45:23

Method: Direct Injection

Description: CHANNEL 2 - PID

Hanne, Look

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Ambient H2O

Ethylene Oxide

Analysis date: 11/17/2017 09:45:23

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B

0.350

0.500

0.1270

6.4090

8.8390

0.0000

13.7278

13.7278 ppm

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-1B06.CHR (c:\peak359) Data file: 2SterOnt2017-1B06.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Sample: Oxidizer #1 Inlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 Pytomal/Units 10.0000/ 2.3150/0.216 0.0000/ Ambient H2O 169.2890/0.383 0.0000/ 7,4455/0,500 15.9479/ppm Component Retention External Units Retention External Units Area Component Area Dead Vol / Air 0.216 2.3150 0.0000 Ambient H2O 0.383 169.2890 0.0000 Ethylene Oxide 0.500 7.4455 15.9479 ppm

Lab haine, Loci

Client ID: Run#1BV Analysis date: 11/17/2017 09:46:32

Carrier: HELIUM

Temp. prog: eto-100.tem

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

169.2890

0.0000

Lab Haine, Looi

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:46:32 Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

9.7605

Data file: 1SterOnt2017-1B07.CHR (c:\peak359) Data file: 2SterOnt2017-1B07.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64,000 0.0000/Units 2.1960/0.233 0.0000/ 168.9610/0.400 0.0000/ 16.6912/ppm Component External Units Retention Area Component Retention External Units Area Dead Vol / Air 0.233 2.1960 0.0000 **Ambient H2O** 0.400 168.9610 0.0000 Ethylene Oxide 0.516 7.7925 16.6912 ppm 168.9610 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Client ID: Run#1BV Analysis date: 11/17/2017 09:48:01

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

9.9885

16.6912

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Analysis date: 11/17/2017 09:48:01 Method: Direct Injection

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-1B09.CHR (c:\peak359) Data file: 1SterOnt2017-1B09.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64,000 0.0000/Unii 2.3700/0.216 ead Vol / Air 0.0000/ 172.0560/0.366 7.1040/0.500 15.2164/ppm Component Retention External Units Area Component Retention External Units Area 0.216 2.3700 0.0000 Dead Vol / Air Ambient H2O 0.366 172.0560 0.0000 Ethylene Oxide 0.500 7.1040 15.2164 ppm

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.0000

172.0560

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:50:37 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

9.4740

15.2164

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 09:50:37

Method: Direct Injection
Description: CHANNEL 1 - FID

Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B10.CHR (c:\peak359) Data file: 2SterOnt2017-1B10.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 3.200 32.000 -6.400 64.000 0.0000/Units 2.2730/0.233 0.0000/ 0.1100/0.366 0.0000/ 166.5410/0.383 0.0000/ 7.2550/0.516 Retention External Units Component Area Component Retention External Units Area 0.0000 Dead Vol / Air 0.233 2.2730 Ambient H2O 0.383 166.5410 0.0000 Ambient H2O 0.366 0.0000 0.1100

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.0000

166.5410

Client ID: Run#1BV

Analysis date: 11/17/2017 09:51:55 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

7.2550

9.6380

15.5399 ppm

15.5399

Client ID: Run#1BV

Ethylene Oxide

Analysis date: 11/17/2017 09:51:55 Method: Direct Injection

Temp. prog: eto-100.tem Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-1B11.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-1B11.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3,200 32.000 64.000 2.1865/0.233 0.0000/ lead Vol / Air Ambient H2O 164 9345/0.383 lo.ooon/ 15.5570/ppm Retention External Units Component Retention External Units Component Area Area Dead Vol / Air 0.233 2.1865 0.0000 **Ambient H2O** 0.383 164.9345 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.0000

164.9345

Client ID: Run#1BV

Carrier: HELIUM

Analysis date: 11/17/2017 09:53:09

Method: Direct Injection

Description: CHANNEL 2 - PID

Lab Haine. Looi

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 09:53:09

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B

0.516

7.2630

9.4495

15.5570 ppm

Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt Temp. prog: eto-100.tem Components: eto1-100.cpt Data file: 2SterOnt2017-1B12.CHR (c:\peak359) Data file: 1SterOnt2017-1B12.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 -3.200 2.3100/0.216 0.0000/ lead Vol / Atr 0.0000/ Component Retention External Units Component Retention External Units Area Area 0.0000 Dead Vol / Air 0.216 2.3100 Ambient H2O 0.383 168.9950 0.0000 Ethylene Oxide 0.500 6.9105 14.8020 ppm

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

168.9950

0.0000

Client ID: Run#1BV

Analysis date: 11/17/2017 09:54:14 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

9.2205

14.8020

Client ID: Run#1BV Analysis date: 11/17/2017 09:54:14 Method: Direct Injection

Components: eto1-100.cpt
Data file: 1SterOnt2017-1B13.CHR (c:\peak359) Components: eto2-100.cpt Data file: 2SterOnt2017-1B13.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -12.800 -6.400 64.000 Dead Vol / Air 0.0000/ Dead Vol / Air 2,2790/0.233 0.0000/ Ambient H2O 180.8040/0.400 0.0000/ 81.4050/0.516 174.3656/ppm Component Retention External Units Area Component Retention Area External Units Dead Vol / Air 0.233 2.2790 0.0000 Dead Vol / Air 0.100 0.0000 18.2050 Ethylene Oxide 0.516 81.4050 174.3656 ppm Ambient H2O 0.400 180.8040 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

199.0090

0.0000

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 10:06:01 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

83.6840 174.3656

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 10:06:01 Method: Direct Injection Description: CHANNEL 1 - FID

Data file: 2SterOnt2017-1B14.CHR (c:\peak359)
Sample: Oxidizer #1 Outlet Data file: 1SterOnt2017-1B14.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 -6.400 64.000 F-to-mal/Units 0.0000/ Dead Vol / Air 2.3205/0.216 0.0000/ Ambient H2O 175 4800/0.383 ര ദരവ 9.3530/0.500 20.0337/ppm Ethylene Oxide Component Retention External Units Retention External Units Area Component Area

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

175.4800

175.4800

0.0000

0.0000

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 10:07:15 Method: Direct Injection

Description: CHANNEL 2 - PID

, i icai i i c.

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 10:07:15

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

2.3205

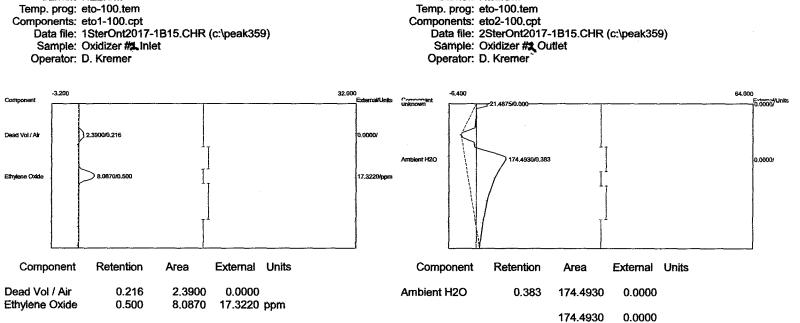
9.3530

11.6735

0.0000

20.0337

20.0337 ppm



Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

10.4770 17.3220

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

Analysis date: 11/17/2017 10:08:25 Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Client ID: Run#1BV Analysis date: 11/17/2017 10:08:25

Carrier: HELIUM

Method: Direct Injection

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B16.CHR (c:\peak359) Data file: 2SterOnt2017-1B16.CHR (c:\peak359) Sample: Oxidizer #3 Inlet Sample: Oxidizer #2,Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 -6.400 0.0000/Units Component 2.3570/0.216 Dead Vol / Air 0.0000/ Ambient H2O 0.0000/ Ambient H2O 173.1240/0.383 0.0000/ 7.2050/0.500 Ethylene Oxide 15.4328/oom Retention Component Area External Units Retention Component Area External Units

Ambient H2O

Lab name: Ecoi

Client ID: Run#1BV

Carrier: HELIUM

Analysis date: 11/17/2017 10:09:31

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

173.1240

173.1240

0.0000

0.0000

Lab name: ECSI

Client ID: Run#1BV

Carrier: HELIUM

Dead Vol / Air

Ambient H2O

Ethylene Oxide

Analysis date: 11/17/2017 10:09:31

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.350

0.500

2.3570

0.1055

7.2050

9.6675

0.0000

0.0000

15.4328

15.4328 ppm

Data file: 1SterOnt2017-1B17.CHR (c:\peak359)
Sample: Oxidizer # Inlet
Operator: D. Kremer Data file: 2SterOnt2017-1B17.CHR (c:\peak359)
Sample: Oxidizer #3 Outlet
Operator: D. Kremer -3.200 32.000 64,000 E-demal/Units 2.4910/0.216 10000.0 173.8730/0.383 7.0610/0.500 15.1243/ppm Component Retention Area External Units Component Retention External Units Area 0.0000 Ambient H2O 0.0000 Dead Vol / Air 0.216 2.4910 0.383 173.8730

Lab name. Loci

Client ID: Run#1BV

Temp. prog: eto-100.tem Components: eto2-100.cpt

Analysis date: 11/17/2017 10:10:42 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

173.8730

0.0000

Lab hame: ECOI

Client ID: Run#1BV Analysis date: 11/17/2017 10:10:42

Temp. prog: eto-100.tem Components: eto1-100.cpt

Ethylene Oxide

Method: Direct Injection Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.500

7.0610

9.5520

15.1243 ppm

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto2-100.cpt Components: eto1-100.cpt Data file: 2SterOnt2017-1B18.CHR (c:\peak359) Data file: 1SterOnt2017-1B18.CHR (c:\peak359) Sample: Oxidizer # Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 External/Units 64.000 External/Unit -3.200 15.9660/0.083 0.0000/ 2.3680/0.233 0.0000/ 0.1540/0.350 167.1820/0.383 0.0000/ Ambient H2O 6.6805/0.516 4.3093/ppn Retention External Units Component Retention External Units Component Area Area

Dead Vol / Air

Ambient H2O

Lab hame. Eco

Client ID: Run#1BV

Carrier: HELIUM

Analysis date: 11/17/2017 10:12:05

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.083

0.383

15.9660

167.1820

183.1480

0.0000

0.0000

0.0000

Lad name: ECSI

Client ID: Run#1BV Analysis date: 11/17/2017 10:12:05

Carrier: HELIUM

Dead Vol / Air

Ambient H2O

Ethylene Oxide

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.350

0.516

2.3680

0.1540

6.6805

9.2025

0.0000

0.0000

14.3093

14.3093 ppm

Data file: 2SterOnt2017-1B19.CHR (c:\peak359)
Sample: Oxidizer #2 Outlet Data file: 1SterOnt2017-1B19.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 -3.200 0.0000/Links 2.3070/0.216 Dead Vol / Air 0.0000/ 171.8630/0.383 0.0000/ 6.6710/0.500 14.2890/ppm Component Retention Area External Units Component Retention Area External Units Dead Vol / Air 0.216 2.3070 0.0000 Ambient H2O 0.383 171.8630 0.0000

Lav Hallic. Luci

Client ID: Run#1BV Analysis date: 11/17/2017 10:13:15

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

171.8630

0.0000

Lab Hairie. LUSI

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 10:13:15 Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.6710

8.9780

14.2890 ppm

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-1B20.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-1B20.CHR (c:\peak359)
Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 0.0000/Un 2.4060/0.216)ead Vol / Air 7.1415/0.500 Component Retention External Units Retention Area Component Area External Units Dead Vol / Air 0.216 2.4060 0.0000 Ambient H2O 0.383 171.5830 0.0000 Ethylene Oxide 0.500 7.1415 15.2968 ppm 171.5830 0.0000

Lab name. Loo

Client ID: Run#1BV Analysis date: 11/17/2017 10:14:25

Carrier: HELIUM

Temp. prog: eto-100.tem

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Lab Harrie. ECOI

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 10:14:25

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

9.5475

Data file: 1SterOnt2017-1B21.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-1B21.CHR (c:\peak359)
Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 External/Units 2.3100/0.233 Jead Vol / Air 1,0000 0.1050/0.366 0.00001 umblent H2O 16.7983/ppm External Units Component Retention Area Component Retention Area External Units Dead Vol / Air 0.233 2.3100 0.0000 Ambient H2O 0.383 170.1690 0.0000 Ambient H2O 0.366 0.1050 0.0000

16.7983 ppm

Lay Hallie, Lyyi

Client ID: Run#1BV Analysis date: 11/17/2017 10:15:43

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

170.1690

0.0000

Lab hame. ECSI

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 10:15:43

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B

0.500

7.8425

10.2575 16.7983

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B22.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-1B22.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 -6.400 64.000 -3.200 E-vicence/Unit: 2.3050/0.233 0.0000/ lead Vol / Air Ambient H2O 7.2230/0.500 15.4713/ppm Component Retention Area External Units Component Retention Area External Units

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

171.6480

171.6480

0.0000

0.0000

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 10:16:53 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.500

2.3050

7.2230

9.5280

0.0000

15.4713

15.4713 ppm

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 10:16:53

Method: Direct Injection
Description: CHANNEL 1 - FID

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-1B23.CHR (c:\peak359)
Sample: Oxidizer #2 Outlet Data file: 1SterOnt2017-1B23.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 -3.200 0.0000/Units 2.3235/0.233 0.0000/)ead Vol / Alr Ambient H2O 15.9168/ppm Component Retention Area External Units Component Retention Area External Units

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

168.8325

168.8325

0.0000

0.0000

Client ID: Run#1BV

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 10:18:04

Method: Direct Injection
Description: CHANNEL 2 - PID

manic.

Client ID: Run#1BV

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 10:18:04

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.233

0.516

2.3235

7.4310

9.7545

0.0000

15.9168

15.9168 ppm

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-1B24.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-1B24.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 64.000 External/Unit 2,4095/0,233 0.0000/ Dead Vol / Air Ambient H2O 168.6325/0.383 0.0000/ 14.5610/ppm

Component

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Retention

0.383

Агеа

168.6325

168.6325

External Units

0.0000

0.0000

Client ID: Run#1BV

Carrier: HELIUM

Analysis date: 11/17/2017 10:19:12

Method: Direct Injection
Description: CHANNEL 2 - PID

Hanc.

Component

Dead Vol / Air

Ethylene Oxide

Client ID: Run#1BV Analysis date: 11/17/2017 10:19:12

Carrier: HELIUM

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Retention

0.233

0.516

Area

2.4095

6.7980

9.2075

External Units

14.5610 ppm

0.0000

APPENDIX C

Aeration Chromatograms



Analysis date: 11/17/2017 10:30:46 Analysis date: 11/17/2017 10:30:46 Method: Direct Injection Method: Direct Injection Description: CHANNEL 1 - FID Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B Column: 1% SP-1000, Carbopack B Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt Temp. prog: eto-100.tem Components: eto2-100.cpt Data file: 1SterOnt2017-1A01.CHR (c:\peak359) Data file: 2SterOnt2017-1A01.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 -6.400 64.000 16.8840/0.083 Dead Vol / Air 0.0000/ Dead Vol / Air 2 2065/0 233 0.0000 Ambient H2O 0.0000/ 8.7225/0.516 Ethylene Oxide 18.6832/ppm Component Retention External Units Area Component Retention Area External Units Dead Vol / Air 0.233 2.2065 0.0000 Dead Vol / Air 0.083 16.8840 0.0000 181.3830 Ethylene Oxide 0.516 8.7225 18.6832 ppm Ambient H2O 0.400 0.0000

18.6832

10.9290

Client: Sterigenics - Ontario

198.2670

0.0000

Client ID: Run#1Aer

Client: Sterigenics - Ontario

Client ID: Run#1Aer

Data file: 1SterOnt2017-1A03.CHR (c:\peak359) Data file: 2SterOnt2017-1A03.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 -3.200 20.2295/0.066 0.0000/ 2.2430/0.216 00000/ Dead Vol / Air 17.9164/ppm Component Retention Area External Units Component Retention Area External Units 0.0000 Dead Vol / Air 0.066 0.0000 Dead Vol / Air 0.216 2.2430 20.2295

Ambient H2O

Lab Haitic, Loci

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Analysis date: 11/17/2017 10:35:07 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

180.5400

200.7695

0.0000

0.0000

Lab hame. ECO

Client ID: Run#1Aer Analysis date: 11/17/2017 10:35:07

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

8.3645

10.6075

17.9164 ppm

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-1A05.CHR (c:\peak359) Data file: 1SterOnt2017-1A05.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 -6.400 64.000 5.5300/0.083 .0000/ 2.2465/0.233 Dead Vol / Air 0.0000/ Ambient H2O 184 3200/0 383 o nnnnı 8.0690/0.500 17.2834/ppm Ethylene Oxide Component Retention External Units Area Component Retention Area External Units Dead Vol / Air 0.233 2.2465 0.0000 Dead Vol / Air 0.083 15.5300 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

184.3200

199.8500

0.0000

0.0000

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 10:40:35

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

8.0690

10.3155 17.2834

17.2834 ppm

Client ID: Run#1Aer Analysis date: 11/17/2017 10:40:35

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Method: Direct Injection

Data file: 1SterOnt2017-1A07.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-1A07.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 External/Units -3.200 32,000 -6.400 Component 4.4770/0.083 0.0000/ 2.2550/0.233 0.0000 Dead Vot / Air 177.2795/0.400 Ambient H2O 0.0000/ 7.7035/0.516 16.5005/ppm Ethylene Oxide Component Retention External Units Retention External Units Area Component Area

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.083

0.400

14.4770

177.2795

191.7565

0.0000

0.0000

0.0000

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 10:45:19

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.516

2.2550

7.7035

9.9585

0.0000

16.5005

16.5005 ppm

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 10:45:19

Method: Direct Injection

Components: eto1-100.cpt Data file: 1SterOnt2017-1A09.CHR (c:\peak359) Data file: 2SterOnt2017-1A09.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Sample: Oxidizer #1 Inlet Operator: D. Kremer Operator: D. Kremer 64,000 External/Units -3,200 32.000 -6.400 15.9110/0.083 Dead Vol / Air 0.0000/ 2.1645/0.233 Dead Vol / Air 0.0000/ Ambient H2O 173.1130/0.400 0.0000/ 8,8690/0,516 Ethylene Oxide 18.9970/ppm Retention Retention External Units External Units Component Area Component Area

Dead Vol / Air

Ambient H2O

Lab halle, Looi

Client ID: Run#1Aer Analysis date: 11/17/2017 10:50:20

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.083

0.400

15.9110

173.1130

189.0240

0.0000

0.0000

0.0000

Lab hame. ECOI

Client ID: Run#1Aer

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 10:50:20

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.233

0.516

0.0000

18.9970

18.9970 ppm

2.1645

8.8690

Data file: 2SterOnt2017-1A11.CHR (c:\peak359) Data file: 1SterOnt2017-1A11.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 64,000 External/Unit -3.200 17.1345/0.100 0.0000/ Dead Vol / Air 2.2470/0.233 0.0000/ 174.0210/0.383 Ambient H2O 0.0000/ 8.0740/0.516 17.2941/ppm Component Retention Area External Units Component Retention Area External Units Dead Vol / Air 0.233 2.2470 0.0000 Dead Vol / Air 0.100 17.1345 0.0000

Ambient H2O

17.2941 ppm

17.2941

Lab Harrie. Ecoi

Client ID: Run#1Aer Analysis date: 11/17/2017 10:55:09

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Method: Direct Injection Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.383

174.0210

191.1555

0.0000

0.0000

Lad Hame. ECOI

Client ID: Run#1Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 10:55:09 Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

8.0740

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-1A13.CHR (c:\peak359) Data file: 1SterOnt2017-1A13.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 15.7990/0.050 Dead Vol / Air 0.0000/ 2.2030/0.233 10000.0 Ambient H2O 171.7720/0.400 0.0000/ 18.3887*|*ppm Component Retention Area External Units Component Retention External Units Area Dead Vol / Air 0.233 2.2030 0.0000 Dead Vol / Air 0.050

Ambient H2O

Lab name. Eco

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 11:00:15

Method: Direct Injection Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

15.7990

171.7720

187.5710

0.400

0.0000

0.0000

0.0000

Lab hame: ECSI

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 11:00:15

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

8.5850

10.7880

0.516

18.3887 ppm

Components: eto2-100.cpt
Data file: 2SterOnt2017-1A15.CHR (c:\peak359) Data file: 1SterOnt2017-1A15.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 15.3700/0.066 2.2300/0.233 Dead Vol/Alm Ambient H2O 178.3390/0.383 ก.ดกกด/ 8.1775/0.500 17.5158/ppm Ethylene Oxide Component Retention External Units Retention Area Component External Units Area

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.066

0.383

15.3700

178.3390

193,7090

0.0000

0.0000

0.0000

Client ID: Run#1Aer Analysis date: 11/17/2017 11:05:29

Carrier: HELIUM Temp. prog: eto-100.tem

Method: Direct Injection Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.500

Dead Vol / Air

Ethylene Oxide

0.0000

17.5158 ppm

2.2300

8.1775

10.4075 17.5158

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

Analysis date: 11/17/2017 11:05:29 Method: Direct Injection

Client: Sterigenics - Ontario Client ID: Run#1Aer Analysis date: 11/17/2017 11:10:05 Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

Lad name: ECSI

Data file: 1SterOnt2017-1A17.CHR (c:\peak359)

Sample: Oxidizer #1 Inlet Operator: D. Kremer

10.4500

17.6754

Client: Sterigenics - Ontario Client ID: Run#1Aer

Analysis date: 11/17/2017 11:10:05 Method: Direct Injection Description: CHANNEL 2 - PID

Column: 1% SP-1000, Carbopack B

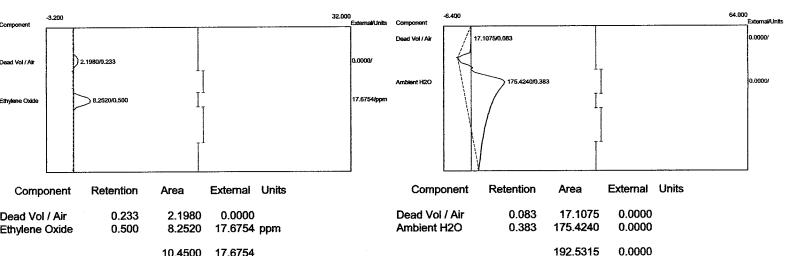
Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Lab name.

Data file: 2SterOnt2017-1A17.CHR (c:\peak359) Sample: Oxidizer #1 Outlet

192.5315

Operator: D. Kremer



Temp. prog: eto-100.tem Components: eto2-100.cpt Components: eto1-100.cpt Data file: 2SterOnt2017-1A19.CHR (c:\peak359) Data file: 1SterOnt2017-1A19.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 Component 13.2500/0.050 Dead Vol / Air 0.00007 2.1225/0.200 Dead Vol / Air 0.0000/ 15.7112/ppm Component Retention External Units Component Retention External Units Area Area

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.050

0.350

13.2500

183.8990

197.1490

0.0000

0.0000

0.0000

Client ID: Run#1Aer Analysis date: 11/17/2017 11:15:23

Carrier: HELIUM

Method: Direct Injection Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.200

0.466

2.1225

7.3350

9.4575 15.7112

0.0000

15.7112 ppm

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 11:15:23

Method: Direct Injection Description: CHANNEL 1 - FID

Data file: 1SterOnt2017-1A21.CHR (c:\peak359) Data file: 2SterOnt2017-1A21.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 External/Unit -3,200 32.000 -6.400 16.8860/0.083 Dead Vol / Air 0.0000/ 2.1590/0.233 0.0000/ Ambient H2O 174.7830/0.400 0.0000/ 16.4545/ppm Component Retention External Units Area Component Retention Area **External Units** Dead Vol / Air 0.233 2.1590 0.0000 Dead Vol / Air 0.083 16.8860 0.0000

Ambient H2O

0.400

174.7830

191.6690

0.0000

0.0000

Lab hame. Econ

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 11:20:05

Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B

Client: Sterigenics - Ontario

Lab haine. ECOI

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 11:20:05

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

7.6820

9.8410

16.4545 ppm

Data file: 1SterOnt2017-1A23.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-1A23.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 -3.200 32.000 -6.400 Component Dead Vol / Air 16.1685/0.033 2.2630/0.216 0.0000/ Ambient H2O 177,7080/0.383 ก กกกก/ 8.3650/0.500 17.9174/ppm Component Retention Area External Units Component Retention Area External Units 0.0000 0.033 0.0000 Dead Vol / Air 0.216 2.2630 Dead Vol / Air 16.1685 Ethylene Oxide 0.500 8.3650 17.9174 ppm Ambient H2O 0.383 177.7080 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

193.8765

0.0000

Client ID: Run#1Aer Analysis date: 11/17/2017 11:25:26

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Method: Direct Injection Description: CHANNEL 2 - PID

Lab Hallie. LUGI

Client ID: Run#1Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Components: eto1-100.cpt

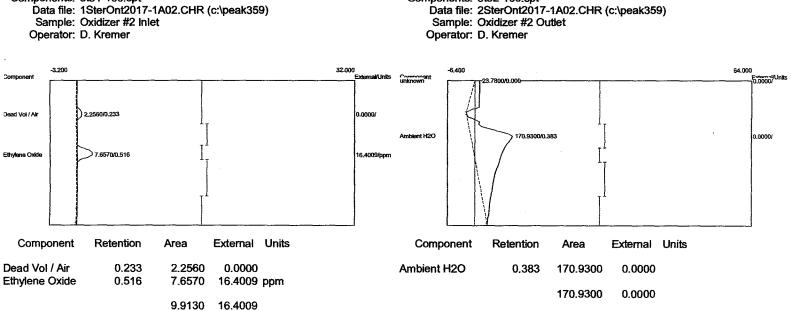
Analysis date: 11/17/2017 11:25:26

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

10.6280



Lap Haine, Looi

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 10:32:46

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Lab Hame. ECSI

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Analysis date: 11/17/2017 10:32:46

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Data file: 1SterOnt2017-1A04.CHR (c:\peak359) Data file: 2SterOnt2017-1A04.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Sample: Oxidizer #2 Inlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 15.7290/0.083 Dead Voi / Air 0.0000/ 2.3600/0.216 Dead Vol / Air 0.0000/ 0.1080/0.350 Ambient H2O 0.0000/ 176.7900/0.383 0.0000/ 7.0845/0.500 15.174**7/**ppm Component Retention Area External Units Component Retention Area External Units 0.0000 Dead Vol / Air 0.216 2.3600 Dead Vol / Air 0.083 15.7290 0.0000 Ambient H2O 0.350 0.1080 0.0000 Ambient H2O 0.383 0.0000 176.7900 0.500

Client: Sterigenics - Ontario

Analysis date: 11/17/2017 10:37:16 Method: Direct Injection

Description: CHANNEL 2 - PID

Column: 1% SP-1000, Carbopack B

0.0000

192.5190

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Lab name. ECSI

Client ID: Run#1Aer

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 10:37:16

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM

7.0845

9.5525 15.1747

15.1747 ppm

Data file: 1SterOnt2017-1A06.CHR (c:\peak359) Data file: 2SterOnt2017-1A06.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 70.0000/Units 2.4100/0.216 Dead Vol / Air 171.4720/0.383 0.0000/ Component Retention External Units Area Component Retention External Units Агеа Dead Vol / Air 0.216 2.4100 0.0000 Ambient H2O 0.383 0.0000 171.4720 Ethylene Oxide 0.500 7.5890 16.2553 ppm

Lad Hallie. Ecol

Client ID: Run#1Aer

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 10:42:10

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B Carrier: HELIUM

171.4720

0.0000

Lab hanne: ECSI

Client ID: Run#1Aer

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Analysis date: 11/17/2017 10:42:10

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM

9.9990

Data file: 2SterOnt2017-1A08.CHR (c:\peak359) Data file: 1SterOnt2017-1A08.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 -3.200 15.1930/0.050 Dead Vol / Air 0.0000/ 2.5020/0.216 .0000/ Dead Vol / Air Ambient H2O 175,6990*I*D 366 15.6534/ppm External Units Component Retention External Units Component Retention Area Area Dead Vol / Air 0.216 2.5020 0.0000 Dead Vol / Air 0.050 0.0000 15.1930 7.3080 15.6534 ppm Ambient H2O 0.0000 Ethylene Oxide 0.500 0.366 175.6990

Lab hame. Econ

Client ID: Run#1Aer

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 10:47:02 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

190.8920

0.0000

Lab haine. ECO

Client ID: Run#1Aer Analysis date: 11/17/2017 10:47:02

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

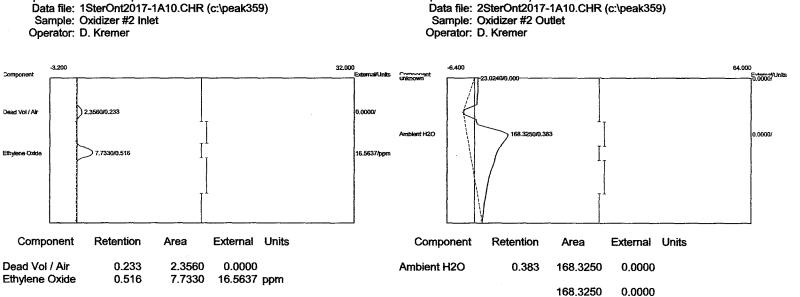
Method: Direct Injection

Description: CHANNÉL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

9.8100



Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 10:52:15

Method: Direct Injection

Description: CHANNEL 2 - PID

Lab hante. Looi

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Analysis date: 11/17/2017 10:52:15

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B

10.0890

Data file: 1SterOnt2017-1A12.CHR (c:\peak359) Data file: 2SterOnt2017-1A12.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 Evternel/Units 10,0000/ 2.2420/0.233 Dead Vol / Air 0.0000/ Ambient H2O 0.0000/ 7.8960/0.516 16.9129/ppm Ethylene Oxide External Units Component Retention Area External Units Component Retention Area Dead Vol / Air 0.233 0.0000 2.2420 Ambient H2O 0.383 167.6025 0.0000

Lab Haille. Loo.

Client ID: Run#1Aer Analysis date: 11/17/2017 10:57:25

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

167.6025

0.0000

Client: Sterigenics - Ontario

Analysis date: 11/17/2017 10:57:25

Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

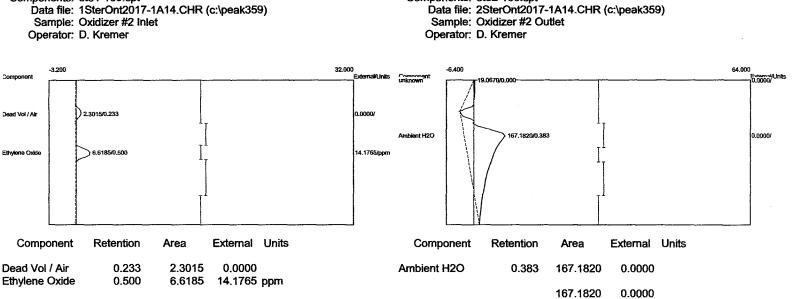
Ethylene Oxide

0.516

7.8960

10.1380

16.9129 ppm



Lad Haille, Loci

Client ID: Run#1Aer Analysis date: 11/17/2017 11:02:33

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Method: Direct Injection

Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Client: Sterigenics - Ontario

Analysis date: 11/17/2017 11:02:33

Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B

8.9200

14.1765

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Data file: 1SterOnt2017-1A16.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-1A16.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 -3,200 Evtornal/Units 2.3305/0.233 0.0000/ Dead Vol / Air Ambient H2O 175,4060/0.383 Component Retention Area External Units Component Retention Area External Units Dead Vol / Air 0.233 2.3305 0.0000 Ambient H2O 0.383 175.4060 0.0000

Lab Harrie, Loci

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 11:07:10

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

175.4060

0.0000

Lay Hallie. LUCI

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 11:07:10

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.3740

8.7045

13.6528 ppm

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-1A18.CHR (c:\peak359) Data file: 2SterOnt2017-1A18.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 14.9570/0.066 Dead Vol / Air 0.0000/ 2.3690/0.216 0.00001 Dead Vot / Air Ambient H2O 0.0000/ 12.8260/ppm Component Retention External Units Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B

0.066

0.383

14.9570

175.8000

190.7570

0.0000

0.0000

0.0000

Method: Direct Injection

Client ID: Run#1Aer Analysis date: 11/17/2017 11:12:15

Carrier: HELIUM

Temp. prog: eto-100.tem

Lab Hairie. ECOI

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 11:12:15 Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Area

2.3690

5.9880

8.3570

0.216

0.500

0.0000

12.8260

12.8260 ppm

Data file: 2SterOnt2017-1A20.CHR (c:\peak359) Data file: 1SterOnt2017-1A20.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 External/Units 32.000 -3.200 19.3320/0.066 2.4525/0.233 5,9980/0.516 12.8474/ppm Component Retention External Units Component Retention External Units Area Area Dead Vol / Air Dead Vol / Air 0.233 2.4525 0.0000 0.066 19.3320 0.0000

Ambient H2O

Lab Hairie. ECO

Client ID: Run#1Aer Analysis date: 11/17/2017 11:17:02

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

166.6810

186.0130

0.0000

0.0000

Lab hame. Ecol

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 11:17:02 Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B

0.516

5.9980

8.4505

12.8474 ppm

Column: 1% SP-1000, Carbopack B Column: 1% SP-1000, Carbopack B Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-1A22.CHR (c:\peak359) Data file: 1SterOnt2017-1A22.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 -6.400 64.000 -3.200 Component 19.8800/0.083 0.0000/ 2.3430/0.233 Dead Vol / Air 0.0000/ Ambient H2O 173.3260/0.383 0.0000 5,9470/0.500 12.7382/ppm 0.1030/0.783 0.0000/

Client: Sterigenics - Ontario

Retention

0.083

0.383

Area

19.8800

173.3260

193.2060

Component

Dead Vol / Air

Ambient H2O

External Units

0.0000

0.0000

0.0000

Client ID: Run#1Aer

Analysis date: 11/17/2017 11:22:04 Method: Direct Injection

Description: CHANNEL 2 - PID

External Units Component Retention Area Dead Vol / Air 0.233 2.3430 0.0000 12.7382 ppm Ethylene Oxide 0.500 5.9470 Acetaldehyde 0.783 0.1030 0.0000 8.3930 12.7382

Client: Sterigenics - Ontario

Client ID: Run#1Aer Analysis date: 11/17/2017 11:22:04

Method: Direct Injection
Description: CHANNEL 1 - FID

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-1A24.CHR (c:\peak359) Data file: 2SterOnt2017-1A24.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 Component 20.4195/0.050 Dead Vol / Air 0.0000/ 2.3440/0.233 0.0000/ Dead Vol / Air 0.1260/0.350 0.0000/ Ambient H2O 171.7070/0.383 0.0000/ 6.6090/0.500 Ethylene Oxide 14.1562/ppm Component Retention **External Units** Area Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.050

0.383

20.4195

171.7070

192.1265

0.0000

0.0000

0.0000

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 11:27:20

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.350

0.500

2.3440

0.1260

6.6090

9.0790

0.0000

0.0000

14.1562

14.1562 ppm

Client ID: Run#1Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ambient H2O

Ethylene Oxide

Analysis date: 11/17/2017 11:27:20

Method: Direct Injection

Description: CHANNEL 1 - FID

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-2A01.CHR (c:\peak359) Data file: 2SterOnt2017-2A01.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 64.000 17.1790/0.066 Dead Vol / Air 0.0000/ 2.2680/0.216 0.0000/ Dead Vol / Air Ambient H2O 0.0000/ 8.0720/0.500 Component Retention Area External Units Component Retention Area External Units 0.216 2.2680 0.0000 Dead Vol / Air 0.066 0.0000 Dead Vol / Air 17.1790

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

8.0720

10.3400

17.2898 ppm

17.2898

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 11:30:53 Method: Direct Injection Description: CHANNEL 1 - FID Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

179.1190

196.2980

0.0000

0.0000

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 11:30:53 Method: Direct Injection

Description: CHANNEL 2 - PID

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-2A03.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-2A03.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64,000 20.3325/0.066 Dead Vol / Air 0.0000/ 2.2310/0.216 0.0000/ 0.1040/0.350 0.0000/ Ambient H2O 179.1900/0,383 0.0000/ 7.9090/0.500 16.9407/ppm Component Retention Area External Units Component Retention Area External Units 0.0000 Dead Vol / Air 0.216 2.2310 Dead Vol / Air 0.066 20.3325 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

179.1900

199.5225

0.0000

0.0000

Client ID: Run#2Aer Analysis date: 11/17/2017 11:35:29

Carrier: HELIUM

Temp. prog: eto-100.tem

Method: Direct Injection

Description: CHANNEL 2 - PID

Lab Hairie. Looi

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ambient H2O

Ethylene Oxide

Analysis date: 11/17/2017 11:35:29

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.350

0.500

0.1040

7.9090

10.2440

0.0000

16.9407

16.9407 ppm

Data file: 1SterOnt2017-2A05.CHR (c:\peak359) Data file: 2SterOnt2017-2A05.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 -6.400 64.000 Component 17.0040/0.116 0.00000 2.2080/0.233 .0000/ Dead Vol / Air Ambient H2O 174,7490/0,383 0.0000/ 8.0320/0.516 17,2042/ppm External Units Component Retention Area Component Retention External Units Area 0.0000 Dead Vol / Air 0.233 2.2080 Dead Vol / Air 0.116 17.0040 0.0000 17.2042 ppm 0.516 8.0320 Ambient H2O 174.7490 0.0000 Ethylene Oxide 0.383

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

191.7530

0.0000

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 11:40:12 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

10.2400 17.2042

Client ID: Run#2Aer Analysis date: 11/17/2017 11:40:12

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

Method: Direct Injection

Description: CHANNEL 1 - FID

Data file: 1SterOnt2017-2A07.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-2A07.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 28.2235/0.116 0.0000/ Dead Vol / Air 2.2100/0.233 0.00007)ead Vol / Alr Ambient H2O 176 4650/0 383 0.0000/ 6.9160/0.500 14.8137/ppm Component Retention Area External Units Component Retention External Units Area Dead Vol / Air 0.233 2.2100 0.0000 Dead Vol / Air 0.116 28.2235 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

176.4650

204.6885

0.0000

0.0000

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Analysis date: 11/17/2017 11:45:17

Method: Direct Injection

Description: CHANNÉL 2 - PID

Lab Haille. Looi

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 11:45:17

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B

0.500

6.9160

9.1260

14.8137 ppm

Data file: 1SterOnt2017-2A09.CHR (c:\peak359) Data file: 2SterOnt2017-2A09.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Sample: Oxidizer #1 Inlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 20.2135/0.100 0.0000/ Dead Vol / Air 2.2675/0.216 0.0000/ Dead Vol / Air 179.4510/0.383 0.0000/ 16.3849/ppm Component Retention Area External Units Component Retention Area External Units 0.0000 Dead Vol / Air 0.216 2.2675 Dead Vol / Air 0.100 20.2135 0.0000

Ambient H2O

16.3849 ppm

16.3849

Lay Haine. Loo

Client ID: Run#2Aer

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 11:50:14

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.383

179.4510

199.6645

0.0000

0.0000

Lad Haille. ECOI

Client ID: Run#2Aer

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 11:50:14 Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.500

7.6495

Data file: 1SterOnt2017-2A11.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-2A11.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -6.400 -3.200 32,000 64.000 21.8310/0.100 0.0000/ 2,2950/0,216 0.0000/ Ambient H2O 175,3190/0.383 0.0000/ 7.2670/0.500 15,5656/ppm Component Retention Area External Units Component Retention Area External Units 0.0000 Dead Vol / Air 0.216 2.2950 Dead Vol / Air 0.100 21.8310 0.0000

Ambient H2O

Lau name. Loo

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Analysis date: 11/17/2017 11:55:05

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B

0.383

175.3190

197.1500

0.0000

0.0000

Lau name. ECOI

Client ID: Run#2Aer

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 11:55:05

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.500

7.2670

9.5620

15.5656 ppm

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-2A13.CHR (c:\peak359) Data file: 1SterOnt2017-2A13.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -6.400 64,000 -3.200 21.7275/0.066 Dead Vol / Air 0.0000/ 2.3340/0.216 0.0000/ ead Vol / Air Ambient H2O 181.7090/0.383 0.0000/ 7.2680/0.500 15.5677/ppm Retention External Units Component Retention External Units Component Area Area

Dead Vol / Air

Ambient H2O

0.0000

15.5677

15.5677 ppm

2.3340

7.2680

9.6020

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:00:14

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B

0.066

0.383

21.7275

181.7090

203.4365

0.0000

0.0000

0.0000

Client ID: Run#2Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:00:14

Method: Direct Injection

Client: Sterigenics - Ontario Client ID: Run#2Aer Analysis date: 11/17/2017 12:05:15

Method: Direct Injection Description: CHANNÉL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-2A15.CHR (c:\peak359) Sample: Oxidizer #1 Inlet

Operator: D. Kremer

Client: Sterigenics - Ontario Client ID: Run#2Aer

Analysis date: 11/17/2017 12:05:15

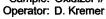
Method: Direct Injection Description: CHANNEL 2 - PID

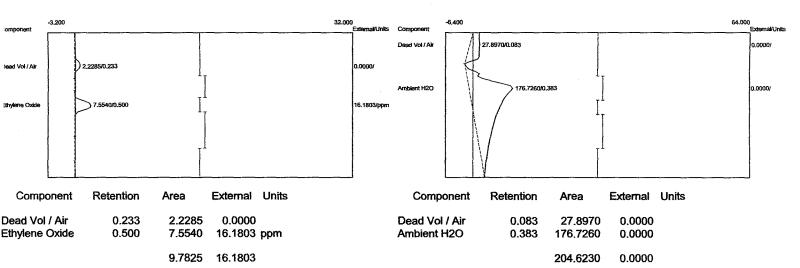
Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Data file: 2SterOnt2017-2A15.CHR (c:\peak359)

Sample: Oxidizer #1 Outlet





Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-2A17.CHR (c:\peak359)
Sample: Oxidizer #1 Outlet Data file: 1SterOnt2017-2A17.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Operator: D. Kremer Operator: D. Kremer 32.000 -6.400 64.000 -3,200 External/Units 2.2730/0.233 0.00001 Jead Vol / Air Ambient H2O 0.0000/ 7.0410/0.516 15.0815/ppm Ethylene Oxide Component Retention Area External Units Component Retention Агеа External Units Dead Vol / Air 0.233 2.2730 0.0000 Ambient H2O 0.383 177.8930 0.0000 Ethylene Oxide 0.516 7.0410 15.0815 ppm

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

177.8930

0.0000

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:10:14

Method: Direct Injection

Description: CHANNEL 2 - PID

Hanie, Looi

Client ID: Run#2Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:10:14

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

9.3140

Data file: 1SterOnt2017-2A19.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-2A19.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 64.000 0.0000/ 2.3725/0.233 Dead Vol / Air 0.0000/ Ambient H2O 173.1065/0.383 6.5590/0.516 14.0491/ppm Ethylene Oxide External Units Component Retention Area Component Retention Area External Units Dead Vol / Air 0.233 0.0000 2.3725 Dead Vol / Air 0.083 25.9875 0.0000

Ambient H2O

Lav name. Levi

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 12:15:14

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

173.1065

199.0940

0.0000

0.0000

Lab Haine. Looi

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 12:15:14

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

6.5590

8.9315

14.0491 ppm

Data file: 1SterOnt2017-2A21.CHR (c:\peak359) Data file: 2SterOnt2017-2A21.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 External/Units -3.200 32,000 19.4000/0.066 Dead Vol / Air 0.0000/ 2.2365/0.233 Dead Vol / Air 0.0000/ Ambient H2O 179.6410/0.383 0.0000/ 6.4910/0.516 13.9034/ppm Component Retention Area External Units Component Retention Area External Units Dead Vol / Air 0.233 2.2365 0.0000 Dead Vol / Air 0.066 19.4000 0.0000 13.9034 ppm

Ambient H2O

Lav Haine. Low

Client ID: Run#2Aer Analysis date: 11/17/2017 12:20:15

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Method: Direct Injection

Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

179.6410

199.0410

0.0000

0.0000

Lab name. Econ

Client ID: Run#2Aer

Temp. prog: eto-100.tem Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 12:20:15

Method: Direct Injection Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B Carrier: HELIUM

0.516

6.4910

8.7275

Client: Sterigenics - Ontario Client ID: Run#2Aer Analysis date: 11/17/2017 12:25:14 Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-2A23.CHR (c:\peak359)

Sample: Oxidizer #1 Inlet Operator: D. Kremer

Client: Sterigenics - Ontario Client ID: Run#2Aer

Analysis date: 11/17/2017 12:25:14

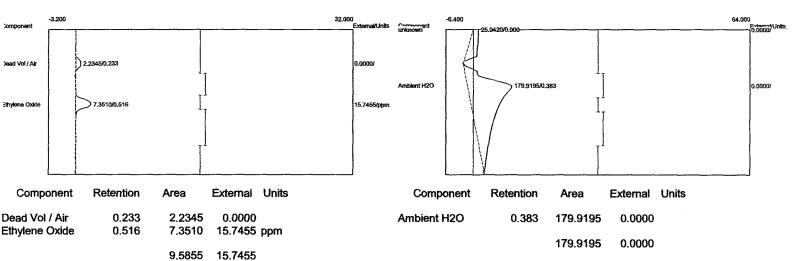
Method: Direct Injection Description: CHANNÉL 2 - PID Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Data file: 2SterOnt2017-2A23.CHR (c:\peak359)

Sample: Oxidizer #1 Outlet

Operator: D. Kremer



Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto2-100.cpt
Data file: 2SterOnt2017-2A02.CHR (c:\peak359) Components: eto1-100.cpt Data file: 1SterOnt2017-2A02.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 -3.200 32.000 Dead Vol / Air 25.8685/D 083 0.0000/ 2.6290/0.216 0.0000/ Dead Vol / Air Ambient H2O 170.7480/0.383 6.3780/0.500 13,6614/ppm

Component

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Retention

0.216

0.500

Area

2.6290

6.3780

9.0070

External Units

13.6614 ppm

0.0000

13.6614

Client ID: Run#2Aer Analysis date: 11/17/2017 11:32:17

Component

Dead Vol / Air

Ethylene Oxide

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Retention

0.083

0.383

Area

25.8685

170.7480

196.6165

External Units

0.0000

0.0000

Client ID: Run#2Aer

Analysis date: 11/17/2017 11:32:17 Method: Direct Injection

Description: CHANNEL 2 - PID

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-2A04.CHR (c:\peak359) Data file: 2SterOnt2017-2A04.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 17.0700/0.083 Dead Vol / Alm 0.0000/ 2.2670/0.233 0.0000/ Ambient H2O 0.0000/ 7.8390/0.516 16,7908/ppm Component Retention Area External Units Component Retention Area External Units 0.233 2.2670 0.0000 Dead Vol / Air 0.083 17.0700 0.0000 Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

170.8745

187.9445

0.0000

0.0000

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 11:37:12 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

7.8390

10.1060

16.7908 ppm

16.7908

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 11:37:12 Method: Direct Injection Description: CHANNEL 1 - FID

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-2A06.CHR (c:\peak359) Data file: 2SterOnt2017-2A06.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 External/Units 32.000 -3.200 Component 17.8010/0.100 Dead Vol / Air 0.0000/)ead Vot / Alir 2.3560/0.233 0.0000/ 0.0000/ 6.0430/0.516 12.9438/ppm 0.1150/0.700 0.0000/ Component Retention Area External Units Component Retention External Units Area 0.0000 Dead Vol / Air 0.233 2.3560 Dead Vol / Air 0.100 17.8010 0.0000

Ambient H2O

12.9438 ppm

0.0000

8.5140 12.9438

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

0.700

6.0430

0.1150

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Acetaldehyde

Analysis date: 11/17/2017 11:42:14 Method: Direct Injection Description: CHANNEL 1 - FID Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.400

174.7745

192.5755

0.0000

0.0000

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 11:42:14 Method: Direct Injection

Description: CHANNEL 2 - PID

Temp. prog: eto-100.tem Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-2A08.CHR (c:\peak359) Data file: 2SterOnt2017-2A08.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Sample: Oxidizer #2 Inlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 mal/Units Component 5.9190/0.066 Dead Vol / Air 0.0000/ 2.4050/0.216 Component Retention Area External Units Component Retention Area External Units 0.216 2.4050 0.0000 Dead Vol / Air 0.066 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B

15.9190

179.3990

195.3180

0.0000

0.0000

0.383

Client ID: Run#2Aer

Carrier: HELIUM

Analysis date: 11/17/2017 11:47:16 Method: Direct Injection

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.2960

8.7010 13.4857

13.4857 ppm

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 11:47:16 Method: Direct Injection

Description: CHANNEL 1 - FID

Temp. prog: eto-100.tem Components: eto2-100.cpt Data file: 1SterOnt2017-2A10.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-2A10.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 2.7930/0.233 Dead Vol / Alt Ambient H2O 172.9765/0.383 0.0000 5.8985/0.500 12.6343/ppm Component Retention External Units Component Retention **External Units** Area Area 0.0000 Dead Vol / Air 0.233 2.7930 Ambient H2O 0.383 172.9765 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.0000

172.9765

Client ID: Run#2Aer

Carrier: HELIUM

Analysis date: 11/17/2017 11:52:40

Method: Direct Injection Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

5.8985

8.6915

12.6343 ppm

12.6343

Client ID: Run#2Aer Analysis date: 11/17/2017 11:52:40

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

Ethylene Oxide

Method: Direct Injection

Description: CHANNEL 1 - FID

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-2A12.CHR (c:\peak359) Data file: 2SterOnt2017-2A12.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 64.000 22.1820/0.033 Dead Vol / Air 0.0000/ 2.4650/0.216 ead Vol / Air 173,6820/0,366 0.0000/ 6.5210/0.500 13.9677/ppm Component Retention External Units Component Retention External Units Area Area

Dead Vol / Air

Ambient H2O

0.0000

13.9677

13.9677 ppm

2.4650

6.5210

8.9860

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.033

0.366

22.1820

173.6820

195.8640

0.0000

0.0000

0.0000

Client ID: Run#2Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 11:57:26

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 11:57:26

Method: Direct Injection Description: CHANNEL 1 - FID

Method: Direct Injection Method: Direct Injection Description: CHANNEL 1 - FID Column: 1% SP-1000, Carbopack B Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-2A14.CHR (c:\peak359) Data file: 2SterOnt2017-2A14.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64,000 External/Units Component 26.3550/0.100 Dead Vol / Altr 0.0000/ 2.4315/0.233 Sead Vol / Air 0.0000/ Ambient H2O 175.6020/0.383 6.4335/0.500 13.7803/ppm Component Retention Area External Units Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

0.233

0.500

2.4315

6.4335

8.8650

0.0000

13.7803

13.7803 ppm

Client ID: Run#2Aer

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:02:14

Client: Sterigenics - Ontario

0.100

0.383

26.3550

175.6020

201.9570

0.0000

0.0000

0.0000

Client ID: Run#2Aer Analysis date: 11/17/2017 12:02:14

Client: Sterigenics - Ontario Client ID: Run#2Aer

Analysis date: 11/17/2017 12:07:20 Method: Direct Injection Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-2A16.CHR (c:\peak359)

Sample: Oxidizer #2 Inlet Operator: D. Kremer

Client: Sterigenics - Ontario Client ID: Run#2Aer

Analysis date: 11/17/2017 12:07:20 Method: Direct Injection Description: CHANNEL 2 - PID

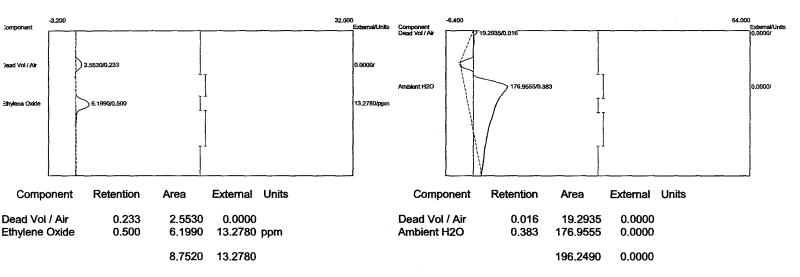
Column: 1% SP-1000, Carbopack B Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto2-100.cpt

Data file: 2SterOnt2017-2A16.CHR (c:\peak359)

Sample: Oxidizer #2 Outlet

Operator: D. Kremer



Components: eto2-100.cpt
Data file: 2SterOnt2017-2A18.CHR (c:\peak359) Components: eto1-100.cpt Data file: 1SterOnt2017-2A18.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 -3.200 32.000 Component Dead Vol / Ala 22,6910/0.083 2.4130/0.216 0.0000/ lead Vol / Air Ambient H2O 177,7710/0.383 0.0000/ 5.4715/0.500 11.7197/ppm Component Retention External Units Component Retention External Units Area Агеа

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

Dead Vol / Air

Ethylene Oxide

0.0000

11.7197

11.7197 ppm

2.4130

5.4715

7.8845

Client ID: Run#2Aer Analysis date: 11/17/2017 12:12:14

Carrier: HELIUM

Temp. prog: eto-100.tem

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.083

0.383

22.6910

177.7710

200.4620

0.0000

0.0000

0.0000

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:12:14 Method: Direct Injection

Description: CHANNEL 2 - PID

Data file: 1SterOnt2017-2A20.CHR (c:\peak359) Data file: 2SterOnt2017-2A20.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Sample: Oxidizer #2 Inlet Operator: D. Kremer Operator: D. Kremer 32.000 64.000 component 17.5520/0.083 Dead Vol / Alr 0.0000/ 2,4155/0,216 0.0000/ Dead Vol / Air 179.6410/0.383 Ambient H2O 0.0000/ 11.6415/ppm Component Retention External Units Component Retention Area External Units Area

Dead Vol / Air

Ambient H2O

Lau Haing, Low

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 12:17:08 Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B

0.083

0.383

17.5520

179.6410

197.1930

0.0000

0.0000

0.0000

Lab Haille. ECOI

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:17:08

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B

0.216

0.500

2.4155

5.4350

7.8505

0.0000

11.6415

11.6415 ppm

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-2A22.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-2A22.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -6.400 64.000 -3.200 32.000 22.4165/0.066 Dead Vol / Air 0.0000/ 2.3750/0.216 0.0000/ Dead Vol / Air Ambient H2O 181.0730/0.383 0.0000/ Ethylene Oxlde 5.7545/0.500 12.3259/ppm Component Retention Area **External Units** Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.066

0.383

0.0000

0.0000

0.0000

22.4165

181.0730

203.4895

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:22:04

Method: Direct Injection

Description: CHANNEL 2 - PID

Lab Hairie. LUGI

Client ID: Run#2Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:22:04

Method: Direct Injection

Description: CHANNÉL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

0.0000

12.3259

12.3259 ppm

2.3750

5.7545

8.1295

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-2A24.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-2A24.CHR (c:\peak359) Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 64.000 18.1240/0.066 Dead Vol / Air 0.0000/ 2.3560/0.233 0.0000/ lead Voi / Air 0.1060/0.350 0.0000/ umbient H2O Ambient H2O 177.7440/9.383 0.0000/ 6.2830/0.500 13.4579/ppm Component Retention Area External Units Component Retention Area External Units 0.0000 Dead Vol / Air 0.233 2.3560 Dead Vol / Air 0.066 18.1240 0.0000

Ambient H2O

0.0000

13.4579

13.4579 ppm

0.1060

6.2830

8.7450

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

177.7440

195.8680

0.0000

0.0000

Client ID: Run#2Aer Analysis date: 11/17/2017 12:27:03

Carrier: HELIUM

Temp. prog: eto-100.tem

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Analysis date: 11/17/2017 12:27:03

Method: Direct Injection
Description: CHANNEL 1 - FID

Column: 1% SP-1000, Carbopack B

0.350

0.500

Client ID: Run#2Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ambient H2O

Ethylene Oxide

Temp. prog: eto-100.tem Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-3A01.CHR (c:\peak359) Data file: 2SterOnt2017-3A01.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 64,000 Component 19.2835/0.066 Dead Vol / Air 0.0000/ 2.1400/0.233 0.0000/ Dead Vol / Air Ambient H2O 184 0960/0 383 ถ กกกก/ 14.5267/ppm 6.7820/0.500 Ethylene Oxide Retention External Units External Units Component Area Component Retention Area

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.066

0.383

19.2835

184.0960

203.3795

0.0000

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Analysis date: 11/17/2017 12:30:17

Method: Direct Injection Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.500

2.1400

6.7820

8.9220

0.0000

14.5267

14.5267 ppm

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:30:17 Method: Direct Injection

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-3A03.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-3A03.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 -6.400 -3.200 64.000 Component 26.1355/0.050 Dead Vol / Alir 0.0000/ Dead Vol / Air 2 3650/0 216 0.0000/ 0.0000/ 6.7070/0.500 14,3661/ppm Component Retention Area External Units Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.050

0.366

26.1355

187.6750

213.8105

0.0000

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:35:20

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

2.3650

6.7070

9.0720

0.0000

14.3661

14.3661 ppm

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:35:20

Method: Direct Injection

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A05.CHR (c:\peak359) Data file: 2SterOnt2017-3A05.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 -6.400 64.000 Dead Vol / Air 20.9880/0.066 0.0000/ 2.2465/0.216 0.0000/ ead Vol / Air Ambient H2O 191.1760/0.383 0.0000/ 6.8970/0.500 14.7730/ppm thylene Oxide Component Retention Area External Units Component Retention External Units Area 0.0000 Dead Vol / Air 0.216 2.2465 Dead Vol / Air 0.066 20.9880 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

191.1760

212.1640

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:40:14 Method: Direct Injection

Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.8970

9.1435

14.7730 ppm

14.7730

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 12:40:14

Method: Direct Injection
Description: CHANNEL 1 - FID

Data file: 1SterOnt2017-3A07.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-3A07.CHR (c:\peak359) Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 Evternal/Uni 2,3110/0.233 0.0000/)ead Vol / Air Ambient H2O 190.9340/0.383 0.0000/ Ethylene Oxide 7.0995/0.500 15,2068/ppm Component Retention External Units Retention Area Component Area External Units Dead Vol / Air 0.233 2.3110 0.0000 Ambient H2O 0.383 190.9340 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

190.9340

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto2-100.cpt

Analysis date: 11/17/2017 12:45:15

Method: Direct Injection
Description: CHANNEL 2 - PID

Lab Haine. Looi

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 12:45:15

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

7.0995

9.4105

15.2068 ppm

15.2068

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A09.CHR (c:\peak359) Data file: 2SterOnt2017-3A09.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 -6.400 64.000 Dead Vol / Air 21.8320/0.050 0.0000/ 2.3190/0.216 0.0000/ Ambient H2O 0.0000 6.9150/0.500 14,8116/ppm Ethytene Oxide External Units Component Retention Area Component Retention Area External Units 2.3190 0.0000 Dead Vol / Air 0.216 Dead Vol / Air 0.050 21.8320 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

189.3790

211.2110

0.0000

0.0000

Client ID: Run#3Aer Analysis date: 11/17/2017 12:50:25

Carrier: HELIUM

Temp. prog: eto-100.tem

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.9150

9.2340

14.8116 ppm

14.8116

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 12:50:25

Method: Direct Injection
Description: CHANNEL 1 - FID

Data file: 1SterOnt2017-3A11.CHR (c:\peak359)
Sample: Oxidizer #1 Inlet Data file: 2SterOnt2017-3A11.CHR (c:\peak359)
Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 Dead Vol / Air 0.0000/ 2.4030/0.216 0.0000/ 15.7134/ppm Component Retention External Units Component Retention External Units Area Area Dead Vol / Air 0.216 2.4030 0.0000 Dead Vol / Air 0.083 0.0000 25.6555

Ambient H2O

Lau name. Loo

Client ID: Run#3Aer

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Analysis date: 11/17/2017 12:55:15

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B

0.383

194.2980

219.9535

0.0000

0.0000

Lab haine. ECOI

Client ID: Run#3Aer

Temp. prog: eto-100.tem Components: eto1-100.cpt

Ethylene Oxide

Analysis date: 11/17/2017 12:55:15

Method: Direct Injection

Client: Sterigenics - Ontario

Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM

0.500

7.3360

9.7390

15.7134 ppm

15.7134

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A13.CHR (c:\peak359) Data file: 2SterOnt2017-3A13.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 Component Dead Vol / Air 21.2110/0.033 0.0000/ 2.2610/0.233)ead Vol / Air 0.0000/ Ambient H2O 192,7040/0,383 0.0000/ Ethylene Oxide 7.3770/0.516 15.8012/ppm Retention External Units Component Area Component Retention External Units Area 0.0000 Dead Vol / Air 0.233 2.2610 Dead Vol / Air 0.033 21.2110 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

192.7040

213.9150

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 13:00:07

Method: Direct Injection
Description: CHANNEL 2 - PID

HOITIG.

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 13:00:07

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

7.3770

9.6380

15.8012 ppm

15.8012

Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A15.CHR (c:\peak359) Data file: 2SterOnt2017-3A15.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 70.0000/Units 2.2070/0.233 0.0000/ ead Voi/Air Ambient H2O 197.1285/0.383 0.0000/ 4.3639/ppm Retention External Units Component Area Component Retention Area External Units Dead Vol / Air 0.233 2.2070 0.0000 Ambient H2O 0.383 197.1285 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

197.1285

0.0000

Client ID: Run#3Aer

Analysis date: 11/17/2017 13:05:23 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

6.7060

8.9130

14.3639 ppm

14.3639

Client ID: Run#3Aer

Ethylene Oxide

Analysis date: 11/17/2017 13:05:23

Method: Direct Injection
Description: CHANNEL 1 - FID

Carrier: HELIUM Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt Temp. prog: eto-100.tem Components: eto1-100.cpt Data file: 1SterOnt2017-3A17.CHR (c:\peak359) Data file: 2SterOnt2017-3A17.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 Component 25.4910/0.066 Dead Vol / Air ก ทภกก ead Vol / Air 2.2245/0.233 0.0000/ 6.6410/0.500 14<u>.22</u>47/ppm Component Retention Area External Units Retention External Units Component Area Dead Vol / Air 0.233 2.2245 0.0000 Dead Vol / Air 0.066 25.4910 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

191.4730

216.9640

0.0000

0.0000

Client ID: Run#3Aer

Analysis date: 11/17/2017 13:10:14 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.6410

8.8655

14.2247 ppm

14.2247

Client ID: Run#3Aer

Ethylene Oxide

Analysis date: 11/17/2017 13:10:14 Method: Direct Injection

Components: eto1-100.cpt Components: eto2-100.cpt
Data file: 2SterOnt2017-3A19.CHR (c:\peak359) Data file: 1SterOnt2017-3A19.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 2.2360/0.233 ead Vol/Air .00000/ Ambient H2O 198.8010/0.383 0.0000/ 6.4140/0.516 13.7385/ppm Retention External Units Component Area Component Retention External Units Area 0.0000 Dead Vol / Air 0.233 2.2360 Ambient H2O 0.383 198.8010 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

198.8010

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 13:15:15

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

6.4140

8.6500

13.7385 ppm

13.7385

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 13:15:15

Method: Direct Injection

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt
Data file: 1SterOnt2017-3A21.CHR (c:\peak359) Components: eto2-100.cpt Data file: 2SterOnt2017-3A21.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer 32.000 -6.400 64.000 External/Units 0.0000/ 2.2690/0.233 0.0000/ 0.0000/ 6.4115/0.516 13.7331/ppm Component Retention Area External Units Component Retention External Units Area 0.233 2.2690 0.0000 Ambient H2O 0.383 198.0560 0.0000 Dead Vol / Air

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

6.4115

8.6805

13.7331 ppm

13.7331

Client ID: Run#3Aer

Carrier: HELIUM

Ethylene Oxide

Analysis date: 11/17/2017 13:20:15 Method: Direct Injection Description: CHANNEL 1 - FID Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

198.0560

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Analysis date: 11/17/2017 13:20:15 Method: Direct Injection

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A23.CHR (c:\peak359) Data file: 2SterOnt2017-3A23.CHR (c:\peak359) Sample: Oxidizer #1 Inlet Sample: Oxidizer #1 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 -6.400 64.000 0.0000/U 2,2320/0.233 0.0000/ 0.0000/ 14.2354/ppm Component Retention Area External Units Component Retention External Units Area 0.233 2.2320 0.0000 Dead Vol / Air Ambient H2O 0.383 201.1880 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

201.1880

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Analysis date: 11/17/2017 13:25:14

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

6.6460

8.8780

14.2354 ppm

14.2354

Client ID: Run#3Aer

Carrier: HELIUM

Ethylene Oxide

Analysis date: 11/17/2017 13:25:14

Method: Direct Injection
Description: CHANNEL 1 - FID

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A02.CHR (c:\peak359) Data file: 2SterOnt2017-3A02.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 22.3780/0.066 Dead Vol / Air 0.0000/ 0.0000/ Ambient H2O 182,3870/0,383 0.0000 5.2360/0.500 11.2153/ppm

Component

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Retention

0.066

0.383

Area

22.3780

182.3870

204.7650

External Units

0.0000

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:32:03 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

Retention

0.233

0.500

Area

2.3555

5.2360

7.5915 11.2153

External Units

11.2153 ppm

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Component

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:32:03 Method: Direct Injection

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 2SterOnt2017-3A04.CHR (c:\peak359) Data file: 1SterOnt2017-3A04.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3,200 32,000 64.000 Component omponent 18.2520/0.050 Dead Vol / Air 0.0000/ 2.3300/0.233 0.00001 ead Vol / Air Amhient H2O 0.0000/ 5.4780/0.516 11.7336/ppm Component Retention Area External Units Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.050

0.383

18.2520

185.2680

203.5200

0.0000

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:37:11

Method: Direct Injection

Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.516

2.3300

5.4780

7.8080

0.0000

11.7336

11.7336 ppm

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:37:11 Method: Direct Injection

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A06.CHR (c:\peak359) Data file: 2SterOnt2017-3A06.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 -3.200 0.4220/0.083 Dead Voi / Air 0.0000/ 2.3600/0.233 Dead Vol / Air 187,7340/0,383 0.0000/ Ambient H2O 11.7036/ppm thylene Oxide Retention External Units Component Retention External Units Component Area Area

Dead Vol / Air

Ambient H2O

0.0000

11.7036

11.7036 ppm

2.3600

5.4640

7.8240

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.083

0.383

20.4220

187.7340

208.1560

0.0000

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:42:15

Method: Direct Injection

Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.233

0.500

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:42:15

Method: Direct Injection

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A08.CHR (c:\peak359) Data file: 2SterOnt2017-3A08.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64,000 Component Dead Vol / Air 16.7825/0.066 0.0000/)ead Vol / Air 2.5060/0.216 0.0000/ 5.6400/0,500 12.0806/bom Ethylene Oxide Component Retention External Units Area Component Retention Area External Units

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.066

0.366

16.7825

193.8080

210.5905

0.0000

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:47:01 Method: Direct Injection

Description: CHANNÉL 2 - PID

HEATTE.

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 12:47:01

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

2.5060

5.6400

8.1460

0.0000

12.0806

12.0806 ppm

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A10.CHR (c:\peak359) Data file: 2SterOnt2017-3A10.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer 64.000 0.0000/Units 2.3110/0.233 0.0000/ Dead Vol / Air Ambient H2O 0.0000/ 6.0830/0.516 13.0295/ppm External Units Component Retention Area Component Retention External Units Area Dead Vol / Air 0.233 0.0000 Ambient H2O 187.6300 2.3110 0.383 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

187.6300

0.0000

Client ID: Run#3Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 12:52:02 Method: Direct Injection

Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

6.0830

8.3940

13.0295 ppm

13.0295

Client ID: Run#3Aer Analysis date: 11/17/2017 12:52:02

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Method: Direct Injection
Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario Client ID: Run#3Aer Analysis date: 11/17/2017 12:57:06 Method: Direct Injection Description: CHANNÉL 1 - FID Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto1-100.cpt

Data file: 1SterOnt2017-3A12.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet

Operator: D. Kremer

Client ID: Run#3Aer Analysis date: 11/17/2017 12:57:06

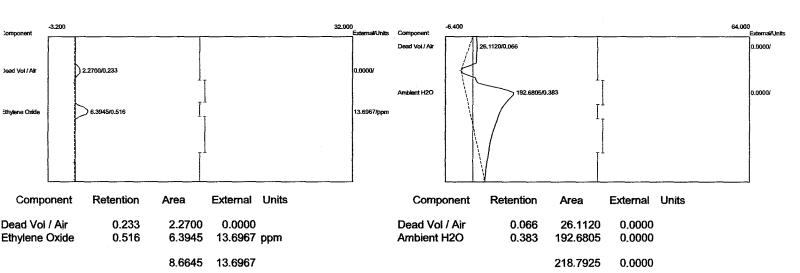
Client: Sterigenics - Ontario

Method: Direct Injection Description: CHANNÉL 2 - PID Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Data file: 2SterOnt2017-3A12.CHR (c:\peak359)

Sample: Oxidizer #2 Outlet Operator: D. Kremer



Client: Sterigenics - Ontario Client ID: Run#3Aer Analysis date: 11/17/2017 13:02:40 Method: Direct Injection Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B

Carrier: HELIUM

Temp. prog: eto-100.tem Components: eto1-100.cpt

Haine, Looi

Data file: 1SterOnt2017-3A14.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet

Operator: D. Kremer

Client: Sterigenics - Ontario Client ID: Run#3Aer

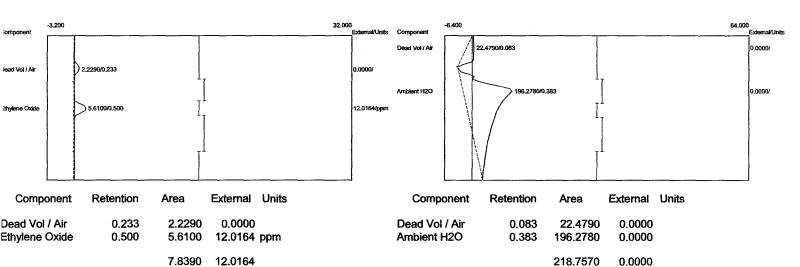
Analysis date: 11/17/2017 13:02:40

Method: Direct Injection Description: CHANNEL 2 - PID Column: 1% SP-1000, Carbopack B

Carrier: HELIUM Temp. prog: eto-100.tem Components: eto2-100.cpt

Data file: 2SterOnt2017-3A14.CHR (c:\peak359)

Sample: Oxidizer #2 Outlet Operator: D. Kremer



Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A16.CHR (c:\peak359) Data file: 2SterOnt2017-3A16.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 5.0000/Units 0.0000/ 0.0000/ 11.5773/ppm Retention External Units Component Area Component Retention Area External Units Dead Vol / Air 0.216 2.3995 0.0000 Ambient H2O 0.366 202.0060 0.0000

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

202.0060

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Analysis date: 11/17/2017 13:07:08 Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.500

5.4050

7.8045

11.5773 ppm

11.5773

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Ethylene Oxide

Analysis date: 11/17/2017 13:07:08

Method: Direct Injection Description: CHANNEL 1 - FID

Temp. prog: eto-100.tem Components: eto1-100.cpt Temp. prog: eto-100.tem Components: eto2-100.cpt Data file: 1SterOnt2017-3A18.CHR (c:\peak359) Data file: 2SterOnt2017-3A18.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32,000 -6.400 64.000 22-2550/0.066 Dead Vol / Air ด กกกก/ lead Vol / Air 2.3340/0.233 B 0000/ 11,7711/ppm thylene Oxide 5.4955/0.516 Component Retention External Units Retention External Units Area Component Area Dead Vol / Air 0.233 2.3340 0.0000 Dead Vol / Air 0.066 22.2550 0.0000

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

196.4960

218.7510

0.0000

0.0000

Client ID: Run#3Aer Analysis date: 11/17/2017 13:12:07 Method: Direct Injection

Carrier: HELIUM

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.516

5.4955

7.8295

11.7711 ppm

11.7711

Client ID: Run#3Aer

Carrier: HELIUM

Ethylene Oxide

Analysis date: 11/17/2017 13:12:07 Method: Direct Injection Description: CHANNEL 1 - FID

Components: eto2-100.cpt Components: eto1-100.cpt Data file: 1SterOnt2017-3A20.CHR (c:\peak359)
Sample: Oxidizer #2 Inlet Data file: 2SterOnt2017-3A20.CHR (c:\peak359)
Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 Component 24,5780/0.083 0.0000/ 2,4510/0.216 0.0000/ 0.0000/ 5.6830/0.500 12.1727/ppm Component Retention Area External Units Component Retention Area External Units

Dead Vol / Air

Ambient H2O

0.0000

12.1727

12.1727 ppm

2.4510

5.6830

8.1340

Lab liallie. Loci

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 13:17:06

Method: Direct Injection
Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

24.5780

202.2780

226.8560

0.083

0.366

0.0000

0.0000

0.0000

Lau Hairie. LOOI

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Dead Vol / Air

Ethylene Oxide

Analysis date: 11/17/2017 13:17:06

Method: Direct Injection

Description: CHANNEL 1 - FID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

Temp. prog: eto-100.tem Temp. prog: eto-100.tem Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A22.CHR (c:\peak359) Data file: 2SterOnt2017-3A22.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 64.000 component Fytomol/Units 10.0000/ 2.4385/0.216 0.0000/ Dead Vol / Air 201,4250/0.383 0.0000/ 5.1410/0.500 11.0118/ppm 0.1680/0.750 0.0000/ Component Retention External Units Retention Units Area Component Area External

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.383

201.4250

201.4250

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Analysis date: 11/17/2017 13:22:04 Method: Direct Injection

Description: CHANNÉL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

2.4385

5.1410

0.1680

7.7475 11.0118

0.216

0.500

0.750

0.0000

0.0000

11.0118 ppm

Client ID: Run#3Aer

Carrier: HELIUM

Dead Vol / Air

Acetaldehyde

Ethylene Oxide

Analysis date: 11/17/2017 13:22:04

Method: Direct Injection Description: CHANNEL 1 - FID

Components: eto1-100.cpt Components: eto2-100.cpt Data file: 1SterOnt2017-3A24.CHR (c:\peak359) Data file: 2SterOnt2017-3A24.CHR (c:\peak359) Sample: Oxidizer #2 Inlet Sample: Oxidizer #2 Outlet Operator: D. Kremer Operator: D. Kremer -3.200 32.000 -6.400 64.000 Dead Vol / Air 21.7550/0.050 0.0000/ 2,4550/0,216 0.0000/)ead Vol / Air 6.0000/ Ambient H2O 12.5818/ppm Component Retention Area External Units Component Retention External Units Area

Dead Vol / Air

Ambient H2O

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.050

0.366

21.7550

203.0650

224.8200

0.0000

0.0000

0.0000

Client ID: Run#3Aer

Carrier: HELIUM

Temp. prog: eto-100.tem

Analysis date: 11/17/2017 13:27:03

Method: Direct Injection

Description: CHANNEL 2 - PID

Client: Sterigenics - Ontario

Column: 1% SP-1000, Carbopack B

0.216

0.500

Dead Vol / Air

Ethylene Oxide

2.4550

5.8740

8.3290

0.0000

12.5818

12.5818 ppm

Client ID: Run#3Aer

Carrier: HELIUM Temp. prog: eto-100.tem

Analysis date: 11/17/2017 13:27:03

Method: Direct Injection
Description: CHANNEL 1 - FID

APPENDIX D

Field Data and Calculation Worksheets



ECSi, Inc.
Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - Ontario, California 11-17-17 - Backvent Test Data - Oxidizer #1

		Stack		Catalyst			
<u>DeltaP</u>	SqRtDeltaP	Temp (F)	ppm EtO	Temp	mw =	28.51	
					stack area =	15.9	
0.14	0.3742	210	0.01	293	press =	28.90	
0.14	0.3742	210	0.01	293	Tstd =	528	
0.14	0.3742	210	0.01	293	Pstd =	29.92	
0.14	0.3742	210	0.01	293	Cp =	0.99	
0.14	0.3742	210	0.01	293	Kp =	85.49	
0.14	0.3742	210	0.01	293			
0.14	0.3742	210	0.01	293	Velocity =	28.6	ft/sec
0.14	0.3742	210	0.01	293	Flow =	20115	dscfm
0.14	0.3742	210	0.01	293			
0.14	0.3742	210	0.01	293	MWeto =	44.05	
0.14	0.3742	210	0.01	293	MolVol =	385.32	
0.14	0.3742	210	0.01	293	ppmv/ft3 =	1000000	
Average =					EtO Mass Flow =	0.0000230	lbs/min
0.14	0.3742	210.0	0.0100	293.0	EtO Mass Flow =	0.001380	lbs/hr

= 670 degR

ECSi, Inc.
Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - Ontario, California 11-17-17 - Backvent Test Data - Oxidizer #2

		Stack		Catalyst			
<u>DeltaP</u>	SqRtDeltaP	Temp (F)	ppm EtO	Temp	mw =	28.51	
					stack area =	7.07	
0.69	0.8307	180	0.01	301	press =	28.90	
0.69	0.8307	180	0.01	301	Tstd =	528	
0.69	0.8307	180	0.01	301	Pstd =	29.92	
0.69	0.8307	180	0.01	302	Cp =	0.99	
0.69	0.8307	180	0.01	302	Kp =	85.49	
0.69	0.8307	180	0.01	302			
0.69	0.8307	180	0.01	302	Velocity =	62.0	ft/sec
0.69	0.8307	180	0.01	302	Flow =	20311	dscfm
0.69	0.8307	181	0.01	302			
0.69	0.8307	181	0.01	302	MWeto =	44.05	
0.69	0.8307	181	0.01	302	MolVol =	385.32	
0.69	0.8307	181	0.01	302	ppmv/ft3 =	1000000	
Average =					EtO Mass Flow =	0.0000232	lbs/min
0.69	0.8307	180.3	0.0100	301.8	EtO Mass Flow =	0.001393	lbs/hr

= 640 degR

ECSi, Inc. Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - Ontario, California 11-17-17 - Aeration Test Data - Oxidizer #1

		Stack		Catalyst			
<u>DeltaP</u>	<u>SqRtDeltaP</u>	Temp (F)	ppm EtO	<u>Temp</u>	mw =	28.51	
Run#1					stack area =	15.9	
0.14	0.3742	212	0.01	293	press =	28.90	
0.14	0.3742	212	0.01	293	Tstd =	528	
0.14	0.3742	212	0.01	293	Pstd =	29.92	
0.14	0.3742	212	0.01	293	Cp =	0.99	
0.14	0.3742	212	0.01	293	Kp =	85.49	
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293	Velocity =	28.6	ft/sec
0.14	0.3742	212	0.01	293	Flow =	20081	dscfm
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293	MWeto =	44.05	
0.14	0.3742	212	0.01	293	MolVol =	385.32	
0.14	0.3742	212	0.01	293	ppmv/ft3 =	1000000	
Run#2							
0.14	0.3742	212	0.01	293	EtO Mass Flow =	0.0000230	lbs/min
0.14	0.3742	212	0.01	293	EtO Mass Flow =	0.001377	lbs/hr
0.14	0.3742	212	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	213	0.01	294			
0.14	0.3742	212	0.01	293			
Run#3							
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	213	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
0.14	0.3742	212	0.01	293			
Average =							
0.14	0.3742	212.3	0.0100	293.3			

672

degR

ECSi, Inc. Ethylene Oxide Mass Emissions Data and Calculations

Sterigenics, Inc. - Ontario, California 11-17-17 - Aeration Test Data - Oxidizer #2

		Stack		Catalyst			
<u>DeltaP</u>	<u>SqRtDeltaP</u>	Temp (F)	ppm EtO	<u>Temp</u>	mw =	28.51	
Run#1					stack area =	7.07	
0.69	0.8307	181	0.01	302	press =	28.90	
0.69	0.8307	181	0.01	302	Tstd =	528	
0.69	0.8307	181	0.01	302	Pstd =	29.92	
0.69	0.8307	181	0.01	302	Cp =	0.99	
0.69	0.8307	181	0.01	302	Kp =	85.49	
0.69	0.8307	182	0.01	302			
0.69	0.8307	182	0.01	302	Velocity =	62.0	ft/sec
0.69	0.8307	182	0.01	302	Flow =	20304	dscfm
0.69	0.8307	182	0.01	302			
0.69	0.8307	181	0.01	301	MWeto =	44.05	
0.69	0.8307	180	0.01	301	MolVol =	385.32	
0.69	0.8307	179	0.01	301	ppmv/ft3 =	1000000	
Run#2							
0.69	0.8307	181	0.01	302	EtO Mass Flow =	0.0000232	lbs/min
0.69	0.8307	181	0.01	302	EtO Mass Flow =	0.001393	lbs/hr
0.69	0.8307	181	0.01	302			
0.69	0.8307	181	0.01	302			
0.69	0.8307	181	0.01	302			
0.69	0.8307	182	0.01	302			
0.69	0.8307	182	0.01	302			
0.69	0.8307	182	0.01	302			
0.69	0.8307	182	0.01	302			
0.69	0.8307	181	0.01	302			
0.69	0.8307	181	0.01	302			
0.69	0.8307	180	0.01	301			
Run#3							
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	181	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
0.69	0.8307	180	0.01	301			
Average =							
0.69	0.8307	180.8	0.0100	301.6			

641

degR

ETHYLENE OXIDE SOURCE TEST/CALIBRATION DATA

	Client: Steriagnics-Ontario CA Source Tested: 2 catalytic Oxidizers Date: 11/17/17											
	PRE CALIBRATION											
	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO	1000 ppm EtO	10080 ppm EtO						
Inlet	Area Counts #1	.509	4.99	46.8								
(FID)	Area Counts #2	.494	4.65	46.6								
	Average Area	.502	4.82	46.7								
		Aud	it Standard	d (48.8 ppm	v) Result	49.3	/)					
	Calibration Gas Conc. (ppmv)	1:10 ppm EtO	10.1 ppm EtO	100 ppm EtO								
Outlet	Area Counts #1	2.13	19.7	171			·					
(PID)	Area Counts #2	2.18	19.3	172			·					
	Average Area	2.16	19.5	172		A						
l	Audit Standard (48.8 ppmv) Result (10.8)											
dizor1 dizer2 dizer2	Run #1 1028 128 1030 130	Run #2 11285228 1139230	Run #3 1223 1233 1230	BV 740 455 Pba 1005 1020 %H	r: <u>23</u> l₂0:	3		ge (lbs/yr): Per Week:				
			POS	ST CAL	IBRAT	ION						
	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO	1000 ppm EtO	10080 ppm EtO						
Inlet	Area Counts #1											
(FID)	Area Counts #2	Y			-							
	Average Area											
		Audi	t Standard	(48.8 ppm	v) Result	48.5	v)		····			
	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO	/							
Outlet	Area Counts #1											
(PID)	Area Counts #2											

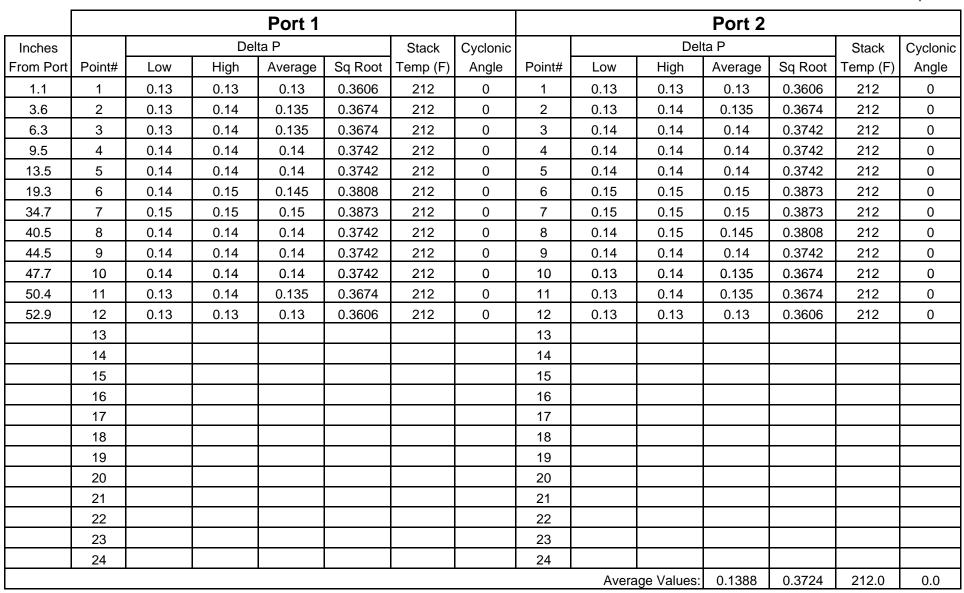
Audit Standard (48.8 ppmv) Result

Average Area

ECSi

ECSI, INC. - VELOCITY TRAVERSE DATA

Client:	Sterigenics	Run #:	1	Date:	11/16/2017	Port Sketch:		
Location: _	Ontario, CA	Probe Type:	Std.	Baro Press:	28.90		()	Ι,
Source:	Oxidizer #1 Outlet	Stack I.D.:	54 in.	DSCFM:	20,000			N



ECSI, INC. - VELOCITY TRAVERSE DATA

Client:	Sterigenics	Run #:	1	Date:	11/16/2017	Port Sketch:		
Location: _	Ontario, CA	Probe Type:	Std.	Baro Press:	28.90	. (·)	.
Source:	Oxidizer #2 Outlet	Stack I.D.:	36 in.	DSCFM:	20,000	,		N↓

_	Port 1						Port 2							
Inches			Del	ta P		Stack	Cyclonic			Delt	ta P		Stack	Cyclonic
From Port	Point#	Low	High	Average	Sq Root	Temp (F)	Angle	Point#	Low	High	Average	Sq Root	Temp (F)	Angle
0.7	1	0.68	0.68	0.68	0.8246	185	0	1	0.68	0.68	0.68	0.8246	185	0
2.4	2	0.68	0.68	0.68	0.8246	185	0	2	0.68	0.69	0.685	0.8276	185	0
4.2	3	0.68	0.69	0.685	0.8276	185	0	3	0.68	0.69	0.685	0.8276	185	0
6.3	4	0.69	0.69	0.69	0.8307	185	0	4	0.69	0.69	0.69	0.8307	185	0
9.0	5	0.69	0.69	0.69	0.8307	185	0	5	0.69	0.69	0.69	0.8307	185	0
12.9	6	0.7	0.7	0.7	0.8367	185	0	6	0.7	0.7	0.7	0.8367	185	0
23.1	7	0.7	0.7	0.7	0.8367	185	0	7	0.7	0.7	0.7	0.8367	185	0
25.0	8	0.69	0.7	0.695	0.8337	185	0	8	0.7	0.7	0.7	0.8367	185	0
29.7	9	0.69	0.69	0.69	0.8307	185	0	9	0.69	0.69	0.69	0.8307	185	0
31.8	10	0.68	0.69	0.685	0.8276	185	0	10	0.69	0.69	0.69	0.8307	185	0
33.6	11	0.68	0.69	0.685	0.8276	185	0	11	0.68	0.69	0.685	0.8276	185	0
35.3	12	0.68	0.68	0.68	0.8246	185	0	12	0.68	0.68	0.68	0.8246	185	0
	13							13						
	14							14						
	15							15						
	16							16						
	17							17						
	18							18						
	19							19						
	20							20						
	21							21						
	22							22						
	23							23						
	24							24						
									Avera	ige Values:	0.6890	0.8300	185.0	0.0

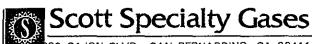
APPENDIX E

Gas Certifications



CERTIFIED WORKING CLASS

Single-Certified Calibration Standard



00 CAJON BLVD., SAN BERNARDINO, CA 92411

Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information

Project No.: 02-57164-001 ltem No.: 02020001310TCL P.O. No.: VBL – D. KREMER

Cylinder Number: CAL4448

Cylinder Size: CL

Certification Date: 18Apr2016

Customer

ECSI, INC PO BOX 848

SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name

ETHYLENE OXIDE NITROGEN Concentration (Moles)

1.10 PPM

Accuracy (<u>+</u>/-%)

5

BALANCE

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY:	 <u>M</u> (
	 MT	

DATE: 4-18-16____

Page 1 of 2

SPECIFICATIONS	Requested Concentration	Certified Concentration	Blend Tolerance Resuit	Certified Accuracy Result	
Component Name	(Moles)	(Moles)	(+/- %)_	(+/- %)	
ETHYLENE OXIDE	1. PPM BAL	1.10 PFM BAL	10.0	5.00	

TRACEABILITY

Traceable To Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure:

1300 PSIG

Expiration Date: 18Apr2018

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard



00 CAJON BLVD., SAN BERNARDINO, CA 92411

Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information

Project No.: 02-57164-003 Item No.: 02020001320TCL P.O. No.: VBL - D. KREMER

Cylinder Number: CLM003232 Cylinder Size: CL Certification Date: 18Apr2016

Customer

ECSI, INC PO BOX 848

SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name

ETHYLENE OXIDE NITROGEN

Concentration (Moles)

10.1

PPM BALANCE Accuracy (+/-%)

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY:		DATE:	4-18-16
	MT		

SPECIFICATIONS Component Name	Reque Concent (Mol-	tration	Certific Concenti (Mole	ration	Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)	· .
ETHYLENE OXIDE	10.	PPM BAL	10.1	PPM BAL	1.0	5.00	

TRACEABILITY

Traceable To Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1400 PSIG

Expiration Date: 18Apr2018

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard



Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information

Project No.: 02-57164-004 Item No.: 02020001330TCL P.O. No.: VBL – D. KREMER

Cylinder Number: CLM011385 Cylinder Size: CL

Certification Date: 18Apr2016

Customer

ECSI, INC PO BOX 848

SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name

ETHYLENE OXIDE NITROGEN

Concentration (Moles)

100.

PPM BALANCE

5

Accuracy

(+/-%)

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY:

B-Mª Cully

DATE: 4-18-16

Page 1 of 2

SPECIFICATIONS Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)	
ETHYLENE OXIDE	100.	PFM BAL	100.	PPM BAL	.0	5.00	

TRACEABILITY

Traceable To

Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: Expiration Date: 18Apr2018

1400 PSIG

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard



Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information

Project No.: 02-57164-005 Item No.: 02020001340TCL P.O. No.: VBL – D. KREMER

Cylinder Number: CLM002810 Cylinder Size: CL Certification Date: 18Apr2016 Customer

ECSI, INC PO BOX 848

SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name

ETHYLENE OXIDE NITROGEN Concentration (Moles)

1.000.

PPM BALANCE Accuracy (+/-%)

5

TRACEABILITY

Traceable To-

Scott Reference Standard

APPROVED BY:

BLM

DATE: 4-18-16

Page 1 of 2

SPECIFICATIONS Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)	
ETHYLENE OXIDE	1,000.	PPM BAL	1,000.	PPM BAL	.0	5.00	

TRACEABILITY

Traceable To Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure:

1300 PSIG

Valve Connection: CGA 350

Expiration Date: 18Apr2018

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard



Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information

Project No.: 02-57164-006 Item No.: 02020001340TCL P.O. No.: VBL - D. KREMER

Cylinder Number: CLM005787 Cylinder Size: CL

Certification Date: 18Apr2016

Customer

ECSI, INC **PO BOX 848**

SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name

ETHYLENE OXIDE **NITROGEN**

Concentration (Moles)

10,080.

PPM

BALANCE

Accuracy (+/-%)

5

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY:

DATE: 4-18-16

Page 1 of 2

SPECIFICATIONS Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		. Blend Tolerand Resulf <u>(</u> +/- %	Result	
ETHYLENE OXIDE NITROGEN	10,000.	PPM BAL	10,080.	PPM BAL	.8	5.00	

TRACEABILITY

Traceable To

Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: Expiration Date: 18Apr2018

800 PSIG

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS



CERTIFICATE OF ANALYSIS

Customer Name:

Stock or Analyzer Tag Number:

Customer Reference: MESA Reference:

Date of Certification:

Recommended Shelf Life:

ECSi, Inc.

N/A

Verbal- Dan

104448

4/20/2016 2 Years

Cylinder Number:

Product Class:

Cylinder - Contents¹: Cylinder-CGA:

Analysis Method:

Preparation Method:

SA25925

Certified Standard

28 CF @ 2000 PSI

A006-HP-BR/350

GC-TCD/FID Gravimetric

Component

Ethylene Oxide

Nitrogen

Requested Concentration²

> 50 ppm Balance

Reported Concentration^{2,3}

48.8 ppm Balance

Authorized Signature:

1. The fill pressure shown on the COA is as originally quoted. The fill pressure measured by the customer may differ from the fill pressure originally quoted due to temperature effects, compressibility of the individual components when blended together in the cylinder, gauge accuracy or reduction in content volume before shipping as a result of samples withdrawn for laboratory QC necessary to ensure product quality.

2. Unless otherwise stated, concentrations are given in molar units.

3. Vapor pressure mixes are blended at a sufficiently low pressure so as to eliminate phase separation under most low temperature conditions encountered during transport or storage. However, it is generally recommended that cylinders containing vapor pressure restricted mixes be placed on the floor in a horizontal position and rolled back and forth to improve homogeneity of the gas phase mixture before being put into service.

Analytical Gas Standards are prepared and analyzed using combinations of NIST traceable weights, SRM's provided by NIST, or internal gas standards that have been verified for accuracy using procedures published by the US-EPA. Pure gases are analyzed and certified for purity using minor component Analytical Gas Standards prepared according to the methods specified above. Balances are calibrated to NIST test weights covered by NIST test number 822/256175/96. Reference Certification #'s: 163/W, 830/N and 3280. Calibration methods are in conformance with MIL-STD 45662A.

MESA Specialty Gave & Equipment division of MESA International Technologies, Inc.
3619 Pendleton Avenue, Suite C. ◆ Santa Ana, California 92704 ◆USA

TEL: 714-434-7102 • FAX: 714-434-8006 • E-mail: mail@mesagas.com On-line Catalog at www.mesagas.com